SRWRS
Sacramento River Water Reliability Study

Interim Report, Appendix A
Assessment of Water Supply Needs

June 2003

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SUMMARY

This Appendix provides a review of water supply needs in 2030 for the cost-sharing partners of Sacramento River Water Reliability Study (SRWRS) including Placer County Water Agency (PCWA), Sacramento Suburban Water District (SSWD), the City of Roseville (Roseville), and the City of Sacramento (Sacramento). Findings will be used as the basis in the SWRWS for developing a water supply strategy and alternatives.

INTRODUCTION

The review of water supply needs covered in the need assessment includes governing legal framework, water supply systems, sources of water supply (water rights, contract entitlements, groundwater, and other supplies), 2030 demand and water supply estimates, and the needs for balancing the 2030 demand and water supply and enhancing water supply reliability. The year 2030 was identified as a planning horizon for consistency with ongoing efforts of the California Department of Water Resources (DWR), the Bureau of Reclamation (Reclamation), and the CALFED Bay-Delta Program (CALFED).

For each purveyor, the latest information was gathered to estimate future demand that is consistent with that purveyor's existing policies and vision for the future. The availability of water supplies was estimated by using existing water rights and contract entitlements, existing and reasonably foreseeable infrastructure (i.e., projects and actions that are currently authorized, funded, permitted, and/or highly likely to be implemented), and commitments made in the Water Forum Agreement (WFA). [1]

For most water purveyors, the WFA limits diversions from the American River by year type (see **Table A-1** for definition). In most cases, limitations are the same for wet and average years and lowest in driest years. Thus, in this Needs Assessment, analysis focuses on conditions in wet/average years and driest years to bookend the potential gap between 2030 demand and water supply, and opportunities to enhance water supply reliability.

Table A-1. American River Basin Water Year Types Defined in the WFA

Water Forum Year Type	Unimpaired Inflow to Folsom Lake, March – November (acre-feet, AF)	Percentage of Total Years in the Period of 1901 through 2002[1]
Wet	Greater than 1,600,000	63 out of 102 years (62%)
Average	Greater than 950,000 and less than 1,600,000	25 out of 102 years (24%)
Drier	Greater than 400,000 and less than 950,000	12 out of 102 years (12%)
Driest	Less than 400,000	2[2] out of 102 years (2%)

[1] Data source: California Data Exchange Center (CDEC).
[2] 1924 and 1977.

To provide a more comprehensive perspective for available water supply, averages by Water Forum year type of deliveries from the Central Valley Project (CVP) and Pacific Gas and Electric Company (PG&E) were factored into the estimates of available water supply. The information about average deliveries was obtained from the CALSIM II Benchmark Study, dated September 2002, and Bear River HEC-3 Model developed by DWR. (See Attachment A for details.) Note that these modeling studies were not developed specifically for the SRWRS, but provide a reasonable indicator of the reliability of these water sources for the needs assessment.

[1] Begun in 1993, the Water Forum is a group composed of business and agricultural leaders, citizens groups, environmentalists, water managers, and local governments in the Sacramento Region who joined together to fulfill two co-equal objectives: (1) provide a reliable and safe water supply for the region's economic health and planned development to the year 2030; and (2) preserve the fishery, wildlife, recreational, and aesthetic values of the Lower American River. In 2000, Water Forum members approved the *WFA*, which consists of seven integrated actions necessary to provide a regional solution to water shortages, environmental damage, groundwater contamination, and limited economic prosperity.

FINDINGS

SRWRS cost-sharing partners provide water service to respective service area for municipal and industrial (M&I) use and agricultural (Ag) use by using groundwater and surface water diverted under water rights or contract entitlements. A detailed assessment for each cost-sharing partner's water supply needs in 2030 is presented in the remainder of the Appendix. Major findings of the needs assessment are summarized as follows:

- The WFA sets different limitations on diversion from the American River for each purveyor, and was signed with certain agreed-on assumptions.
    - PCWA is limited by a total annual diversion volume with the assumption that PCWA would be able to acquire a Sacramento River diversion as an alternate diversion point for its CVP contract entitlement.
    - SSWD is limited by a total annual diversion volume that varies by Water Forum year type with the assumption that SSWD would pursue a Sacramento River diversion to offset the limitation on contract entitlement use.
    - Sacramento is limited by the allowable diversion rate at the Fairbairn Water Treatment Plant (WTP) depending on the bypass flow rate, and limited by the total annual diversion at Fairbairn WTP in driest years. It is assumed that Sacramento would capture those forgone diversions at a location downstream from the confluence with the Sacramento River.
    - No specific limitations apply to future diversions from the Sacramento River.
- Due to WFA limitations on diversions from the American River, the following would occur if no active measures are taken:
    - PCWA, SSWD, and Roseville would divert less than their water rights and/or contract entitlements, even in wet year with 100 percent CVP deliveries (see **Table A-2**).

Table A-2.
Summary of Affected Water Rights and Contract Entitlements for PCWA, SSWD, and Roseville due to WFA Limitations on Diversions from the American River

Water Purveyor	Affected Water Rights and Contract Entitlement due to WFA Limitations on Diversions from the American River[1] (acre-feet, AF)	Source	Note
PCWA	500	MFP[2]	As operations buffer
	35,000	CVP	
SSWD	29,000	MFP	Average/drier/driest years only
Roseville	7,100	MFP or CVP[3]	

[1] Assuming 100 percent CVP allocation.
[2] PCWA's Middle Fork Project.
[3] WFA limitations are on the total amount of diversions from these two contract entitlements.

- PCWA and Roseville would have unmet water supply demands. **Table A-3** shows the demand and water supply conditions for Water Forum **wet**, **average** and **driest** years. The water supply condition of a Water Forum **drier** year is bracketed by those of an average year and of a driest year, but varies according to the hydrologic condition in the American River Basin.

Table A-3. Summary of 2030 Demand and Water Supply for PCWA, SSWD, and Roseville

Water Forum Year Type	Water Purveyor	Type of Use	Demand (AF)	Supply (AF)			Unmet Demand (AF)
				Surface Water[1]	Groundwater	Others[3]	
Wet Years	PCWA	Ag	140,000	85,000	51,000	4,000	0
		M&I	85,400[2]	50,900	0	0	34,500[3]
	SSWD	M&I	92,227	55,064	37,163	0	0
	Roseville	M&I	64,020	58,900	0	2,773	2,347
Average Years	PCWA	Ag	140,000	82,992	53,008	4,000	0
		M&I	85,400[2]	50,900	0	0	34,500[3]
	SSWD	M&I	92,227	26,064	66,163	0	0
	Roseville	M&I	64,020	58,900	0	2,773	2,347
Driest Years	PCWA	Ag	140,000	57,892	66,000	4,000	12,108[4]
		M&I	85,400[2]	50,900	0	0	34,500[3]
	SSWD	M&I	92,227	3,500	88,727	0	0
	Roseville	M&I	64,020	39,800	7,300	11,993	4,927

[1] Surface water supply is limited by WFA when diverted from the American River. See Attachment A for details on assumed deficiencies of CVP North-of-Delta M&I and PG&E supply to PCWA.
[2] For PCWA, reclaimed water; for Roseville, reclaimed water and extra ordinary conservation.
[3] Demand and unmet amounts are based on a slow-growth projection. A future realized growth greater than the assumed slow-growth projection would result in additional unmet demand.
[4] Agricultural deficiency in areas without groundwater accessibility.

- Sacramento would have unmet water supply demands, especially on basis of maximum day (max-day) demand.[2] Although the deficiency in diversion capacity is easily demonstrated by using max-day demand (see **Table A-4**), the actual volume of unmet water supply demand due to WFA limitations varies by hydrologic conditions and is difficult to quantify.

Table A-4. Summary of 2030 Max-Day Demand and Supply for Sacramento

Water Forum Year Type	Hydrologic Condition	Type of Use	Annual Demand (mgd)	Max-Day Demand (mgd)	Max-Day Supply (mgd)		Unmet Max-Day Demand (mgd)
					Surface Water	Groundwater	
Driest Years	All	M&I	257,245	415	260	24	131
All Other Years	Above Hodge[1]	M&I	257,245	415	360	0	55
	Below Hodge[2]	M&I	257,245	415	260	0	155

[1] Above Hodge: The American River flow is above the flow thresholds set forth by the Hodge decision.
[2] Below Hodge: The American River flow is below the flow thresholds set forth by the Hodge decision.

- To balance 2030 demand and supply for each purveyor and enhance water supply reliability, cost-sharing partners are currently pursuing the following options that are consistent to the WFA:

  - PCWA, SSWD, and Roseville seek opportunities to exercise their contract entitlements in full and maintain consistency to their commitments in their WFA Purveyor Specific Agreement (PSA). The increased surface water delivery would meet the unmet municipal and industrial demands and further contribute regional groundwater stabilization for Ag and M&I purposes (see **Table A-5**).

[2] The estimated maximal daily use in a year, which is commonly presented in unit of million gallons per day (mgd) and used as the design capacity for water supply facilities.

- Sacramento seeks opportunities to increase max-day treated water supply capacity for diversions under its water rights and also opportunities to accommodate wheeling requests for increasing water supply reliability in all hydrologic conditions. The increased capacity would allow Sacramento to provide regional water wholesale and wheeling capabilities to areas currently relying solely on groundwater, resulting in significant in-lieu recharge opportunity (see **Table A-5**).

Table A-5.
Summary of Requests for Additional Surface Water Diversion and Treatment Capacity for Balancing 2030 Demand and Supply and Enhancing Water Supply Reliability

Water Purveyor	Requested Additional Surface Water Diversion (AF)	Source	Type of Use	Requested Treatment Capacity (mgd)	Purposes of Requested Treatment Capacity
PCWA	35,000	CVP	M&I	65	For max-day demand
SSWD	29,000[1]	MFP	M&I	15	For redundancy
Roseville	7,100[2]	MFP	M&I	10	For max-day demand
Sacramento	58,000[3]	Water rights, water wheeling requests	M&I	165	For max-day demand (155 mgd) and redundancy (10 mgd)
Total	129,100			255	

[1] SSWD unused contract entitlement is limited in average, drier, and driest years only. SSWD has already had WFA to exercise this entitlement in wet years using diversion from the American River.
[2] Roseville would only consider additional diversion from rivers other than the American River.
[3] The WFA does not establish a volumetric limitation for Sacramento's total diversion. The estimate is based on the difference between the projected demand and the average diversions for Sacramento that can be realized using then-existing diversion facility simulated by CALSIM II in a 2020 Level of Development scenario.

PLACER COUNTY WATER AGENCY

The needs assessment for PCWA includes discussions on the legal framework governing PCWA, PCWA water system and water sources, and estimates of PCWA's 2030 water demand and supply.

LEGAL FRAMEWORK GOVERNING PCWA

PCWA's governing legal framework is largely set forth by California law (including the Placer County Water Agency Act) and the Placer County General Plan.

California Law

PCWA's operations and obligations are governed in part by the Placer County Water Agency Act, which is found in section 81-1 et seq. of the appendices to the California Water Code. Section 81-4 of that enabling legislation gives PCWA the power "to do any and every lawful act necessary in order that sufficient water may be available for any present or future beneficial use or uses of the lands or inhabitants within the agency, including, but not limited, to, irrigation, domestic, fire protection, municipal, commercial, industrial, and all other beneficial uses and purposes." Section 81-4.3 gives PCWA the authority to "appropriate and acquire water and . . . [to] utilize . . . water for any purpose useful to the agency." Section 81-6 gives PCWA the authority to cooperate and contract with Reclamation with respect to the "construction of works" for "water supply" and other purposes.

Although its enabling legislation essentially requires PCWA to serve planned growth within its service area, PCWA does not control local land use decisions creating the need for water supply. Rather, under California law, land use decisions are made only by elected boards of supervisors and city councils. PCWA, then, is subject to the traditional understanding of water suppliers under California law to be a "duty to serve" new

development. As reflected in case law, this obligation has been understood to require water suppliers to find and develop any new water supplies needed to meet projected growth levels in their service areas. (See Swanson v. Marin Municipal Water Dist. (1976) 56 Cal.App.3d 512, 524 (water district has a "continuing obligation to exert every reasonable effort to augment its available water supply in order to meet increasing demands"); Glenbrook Development Co. v. City of Brea (1967) 253 Cal.App.2d 267, 277 ("county water district has a mandatory duty of furnishing water to inhabitants within the district's boundaries"); see also Lukrawka v. Spring Valley Water Co. (1915) 169 Cal. 318, 332; Building Industry Assn. of Northern California v. Marin Municipal Water Dist. (1991) 235 Cal.App.3d 1641, 1648-1649; Slater, California Water Law and Policy (Michie Publications 1996), vol. 2, p. 14-11 (refers to water districts' "duty to serve").

Consistent with this traditional obligation, a "distributor of a public water supply" can refuse to supply water to new development only if the distributor "finds and determines that the ordinary demands and requirements of water customers cannot be satisfied without depleting the water supply of the distributor to the extent that there would be insufficient water for human consumption, sanitation, and fire protection." (California Water Code, § 350.)

PCWA is also subject to the Urban Water Management Planning Act (Water Code, § 10610 et seq.) as amended in 2001 in response to the California Legislature's concern that California's water supply agencies might not be engaged in adequate long-term planning. That Act requires PCWA, as an "urban water supplier," to maintain an "urban water management plan" that must identify existing water supply and demand, and must identify any new water sources required to satisfy demand as projected at least 20 years into the future. The projected 20-year supply must account for "average, single-dry, and multiple-dry water years."

In predicting 20-year water demands, PCWA, like other urban water agencies, must rely on "data from the state, regional, or local service agency population projections[.]" Thus, to the extent that Placer County and its incorporated cities (e.g., Roseville, Rocklin, Lincoln, Auburn, and Loomis) anticipate large population increases in their adopted general plans, PCWA is required to identify water sources necessary to serve such planned development, and is not in a position to refuse to comply with that legal obligation as a means of reducing the "growth-inducing" effects of obtaining new water supplies.

Under California Water Code sections 10910 through 10912 as amended in 2001 (also known as S.B. 610), PCWA must consult with Placer County and the cities within the PCWA service area when those entities propose development projects of a certain magnitude (e.g., residential projects with more than 500 dwelling units or a retail or business establishment employing more than 1,000 persons or having more than 250,000 square feet). PCWA must respond to these requests either by identifying the water sources available to serve such development, or by identifying the plans it would follow to obtain new water supplies for such developments. In the latter instance, such plans may include information concerning: (1) the estimated total costs, and the proposed method of financing the costs, associated with acquiring additional water supplies; (2) all federal, state, and local permits, approvals, or entitlements that are anticipated to be required in order to acquire and develop the additional supplies; and (3) the estimated time frames within which PCWA expects to be able to acquire additional water supplies. (California Water Code, § 10911, subd. (a).)

PCWA is also subject to 2001 state legislation commonly known as the "Kuehl Bill" (SB 221), after its author State Senator Sheila Kuehl. (See Cal. Gov. Code, § 66473.7.) That bill requires any city or county considering the approval of a proposed tentative subdivision map for more than 500 units to consult with the relevant water supply agency to determine whether adequate water is available for the proposed subdivision, as well as for "existing and planned future uses" (including agriculture) over the next 20 years, under "normal, single-dry, and multiple-dry year" scenarios. This new legal scheme, like the Urban Water Management Planning Act, requires PCWA to constantly take the steps that will be necessary to accommodate the growth planned for the next 20 years by Placer County and its incorporated cities.

Placer County General Plan

With respect to water supply demands in the urbanizing unincorporated areas of Placer County, PCWA must operate within the regulatory framework created by the County General Plan, which generally disfavors any increasing reliance on groundwater. For example, General Plan policy 4.C.1 states that "[t]he County shall require proponents of new development to demonstrate the availability of a long-term, reliable water supply." Policy 4.C.2(a) provides that "[u]rban and suburban development should rely on public water systems using surface water." (Emphasis added.) As interpreted and applied by the Placer County Board of Supervisors, such policies effectively preclude PCWA either from serving newly developing urban and suburban unincorporated areas with groundwater or from refusing to serve those areas on the theory that proponents of development should develop their own groundwater supplies. PCWA is therefore somewhat legally constrained from participating in any conjunctive use program that would require new urban development in unincorporated Placer County to rely on groundwater except in exceptional situations.

PCWA'S WATER SYSTEM

Within the boundaries of PCWA's service area, there are five established zones as described below (see **Figure A-1**):

- Zone 1 was created in 1968 for financing the purchase of PG&E's Lower Drum Division Water System. That system included five water treatment plants and associated storage and distribution systems that provided water service to the communities of Auburn, Bowman, Ophir, Newcastle, Penryn, Loomis, Rocklin, and Lincoln. Zone 1 encompasses approximately 125 square miles. Today, Zone 1 includes territory under the land use authorities of the cities of Auburn, Rocklin, and Lincoln, a portion of the City of Roseville, the Town of Loomis, and Placer County. Zone 1 is further broken up into Upper Zone 1 and Lower Zone 1 to delineate the higher elevation service area of Auburn, Bowman, Ophir, and Newcastle from the lower elevation service areas.

- Zone 2 was created in 1979 to provide retail water service for a small residential development of 47 units located southwest of Roseville. Zone 2 is under the land use authority of Placer County. The source of water supply is currently groundwater; however, PCWA intends to serve this area with surface water in the future.

- Zone 3 is a water system acquired from PG&E in 1984 that serves the City of Colfax and portions of Placer County.

- Zone 4 was created in 1996 for the unincorporated Martis Valley portion of eastern Placer County. This zone is served entirely by groundwater.

- Zone 5 was created in 1999 and assumed the boundaries of Placer County Zone 29. It was created to reduce reliance on groundwater supplies by providing surface water for commercial agricultural in the westernmost section of Placer County. PCWA provides only raw surface water supplies to this region.

Currently, about 26 percent of the water supplied by PCWA is treated drinking water distributed through eight individual treated water systems. These systems include Alta, Applegate, Bianchi, Bowman-Auburn, Colfax, Foothill-Sunset, Lahontan and Monte Vista. Six of the systems are supplied through water treatment plants that treat surface water supplied via the PCWA canal system. The Bianchi and Lahontan systems are supplied by groundwater. The PCWA treated water systems supply over 26,000 service connections.

Figure A-1. PCWA's Service Area and Vicinity

About 74 percent of the water currently supplied by PCWA is used for irrigation on farms, ranches, landscapes, parks, and golf courses in Placer County. PCWA operates 165 miles of canals, reservoirs, and diversions to supply approximately 4,500 raw water users. Approximately 3,000 irrigation water customers purchase irrigation water on a year-round basis while approximately another 1,500 customers purchase irrigation water seasonally. The irrigation season normally runs from April 15 through October 14. It typically begins two weeks later in the higher elevation service areas around Colfax. While not a project purpose, PCWA's irrigation water system also provides an indirect benefit to the environment by providing water for wildlife, riparian habitat, fire protection, recreation, and scenic beauty.

PCWA'S WATER SOURCES

For the SRWRS, only water supply to Zones 1 and 5 would be affected. Therefore, the following discussion of water rights and contract entitlements is limited to the water sources of these two zones.

Surface Water Rights and Contract Entitlements

PCWA has three main sources of surface water for water supply to Zones 1 and 5:

- PG&E supply from the Drum-Spaulding Project
- MFP supply
- CVP supply from Reclamation

These three sources of supply are summarized in **Table A-6**.

Table A-6. Summary of PCWA Surface Water Rights and Entitlements for Zones 1 and 5

Water Source	Maximum Annual Amount (AF)	Authorized Point(s) of Diversion
PG&E Drum-Spaulding Project	100,400	Various buy points along PG&E canal system
MFP	120,000	North Fork American River at Auburn Dam site, and Folsom Dam
CVP	35,000	Folsom Dam
TOTAL	255,400	

PG&E-PCWA Water Supply Contract

PG&E's Drum-Spaulding Project supply originates in the upper Yuba River Basin, augmented by Bowman Lake and Lake Spaulding on the South Yuba River and Rollins Reservoir on the Bear River. The water supply is conveyed primarily via the Drum, Bear River, and Upper Boardman canals. PG&E operates the Drum-Spaulding Project mainly for hydropower purposes. Deliveries of water to PCWA depend wholly on the operations of PG&E.

The 1968 PCWA-PG&E Water Supply Contract, as amended in 1996, provides for a maximum annual supply of 100,400 AF of water at specified prices to be delivered through designated points at a total combined delivery rate not in excess of 244.8 cubic feet per second (cfs).

Water available through this contract has been fully exercised to provide M&I use to Zone 1 customers and agricultural use to customers in Zones 1 and 5. Although an integral part of PCWA's water supply, this diversion is not specifically addressed in the SRWRS because the consumptive uses are established and the original diversions are based on PG&E water rights in the Yuba River and Bear River basins.

PCWA's MFP Water Rights

The MFP (see **Figure A-2**) is a multipurpose project designed to conserve and control waters of the Middle Fork American River, the Rubicon River, and certain tributaries for irrigation, domestic, commercial, and recreational purposes and for the generation of electricity.

Principal MFP features include two storage reservoirs (French Meadows and Hell Hole); five diversion dams; five hydroelectric power plants, diversion, and water transmission facilities; five tunnels; and related facilities. French Meadows Reservoir has a gross storage capacity of 136,405 AF and an active storage capacity[3] of 125,600 AF. The French Meadows-to-Hell Hole tunnel has a maximum discharge capacity of 400 cfs. Hell Hole Reservoir has a gross storage capacity of 207,590 AF and an active storage capacity of 202,370 AF. The Hell Hole-to-Middle Fork tunnel has a maximum discharge capacity of 836 cfs; however, discharge through the tunnel is limited to 830 cfs by PCWA's water rights permits. Through its MFP storage rights, PCWA has physical control of more water than it has the right to consumptively divert. In addition, the MFP has an installed generating capacity of 217 megawatts and annually generates about one billion kilowatt-hours of hydroelectric power that are wholesaled to PG&E.

French Meadows Reservoir

Hell Hole Reservoir

When the MFP was constructed in the 1960s, the Auburn Tunnel and a 50-cfs pumping plant on the North Fork American River were installed to enable PCWA to pump water from the American River. Modifications to the Auburn Tunnel and removal of the pumping plant occurred later in anticipation of the construction of Auburn Dam. The current facility at Auburn Dam site is the seasonal pump station installed by Reclamation per a PCWA-Reclamation July 25, 1972, Land Purchase Contract. On August 1, 2002, after the completion of environmental review process, the PCWA Board of Directors formally approved construction of a new permanent American River Pump Station (ARPS) at the same site. This new facility is currently under construction and its scheduled completion date is in 2005-2006. Upon completion, the new ARPS will be able to serve PCWA customers up to 35,500 AF per year using MFP supply.

The authorized diversion points for the PCWA MFP supply are at the Auburn Dam site on the North Fork American River and Folsom Dam. The diversions at Folsom Dam are mainly for PCWA's water sales agreements with San Juan Water District (SJWD), Roseville, and SSWD.

[3] Gross storage is defined as the maximum volume of water stored behind a dam; whereas, active storage is the amount of stored water that PCWA can yield from the reservoir and is typically based on the flow line of the penstock and the required minimum pool elevation.

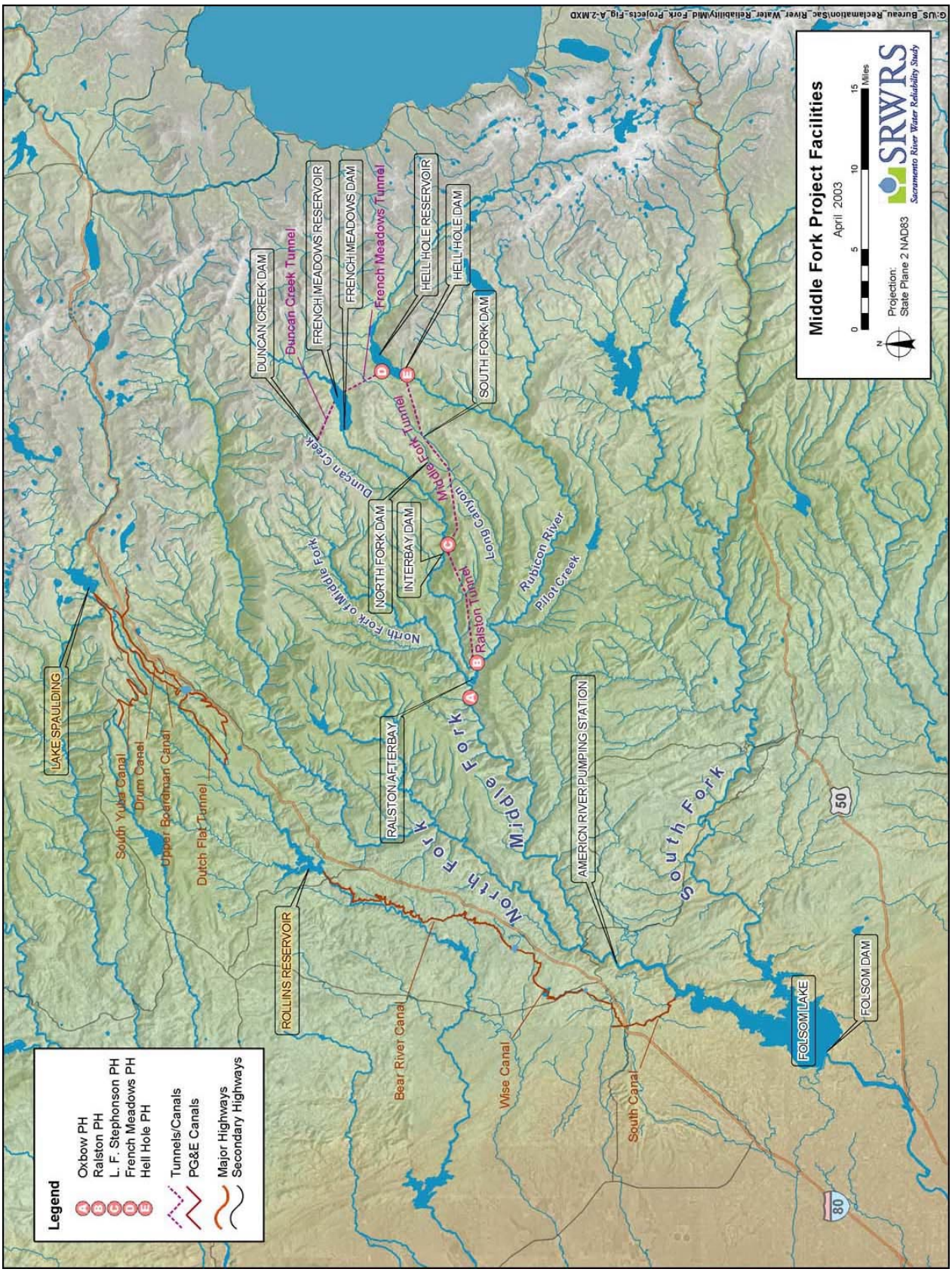

Figure A-2. PCWA MFP Facilities

MFP operations are subject to a host of conditions embodied in the following and described below:

- PCWA's MFP Federal Energy Regulatory Commission (FERC) License
- PCWA's water rights permits issued by the State Water Resources Control Board (SWRCB)
- PCWA-PG&E MFP Power Purchase Agreement
- PCWA-Reclamation Contract, dated February 20, 1963, pertaining to the operation of PCWA's MFP reservoirs
- PCWA-Reclamation 1970 Water Service Contract
- Land Purchase Agreement with Reclamation for the purchase of PCWA's Auburn Pumping Plant site
- PCWA's water sales agreements with San Juan Water District (SJWD), Roseville, and SSWD
- PCWA-Reclamation 1998[4] Amendatory Contract for CVP delivery

MFP FERC License

PCWA owns and operates the MFP pursuant to its FERC license, first issued in 1963, for Project No. 2079. The license[5] contains provisions for maintenance of minimum pools in the reservoirs (Article 36) and minimum bypass flow requirements (Article 37) based on forecasted annual unimpaired runoff into Folsom Lake. **Tables A-7 and A-8** summarize these requirements. Note that the minimum bypass flow requirements are limited by the inflow to the facilities (i.e., MFP is not required to release more than the inflow).

Table A-7. Summary of Minimum Pool Requirements per MFP FERC License (in TAF)

Storage	Annual Unimpaired Runoff to Folsom Lake[1] (TAF)		Period	
	Greater than	Less than	6/1 – 9/30	10/1 – 5/31
French Meadows Reservoir	0	1,200	28	8.7
	1,200	2,000	60	25
	2,000		60	50
Hell Hole Reservoir	0	1,200	26	5.5
	1,200	2,000	70	25
	2,000		70	50
Duncan Creek Diversion Dam	Any forecast		Water surface elevation at 5,259 feet	

[1] Estimated by DWR on or about April 1 of each year. The estimate shall apply for the period of June 1 through May 31 of the succeeding year. The schedule may be modified if found appropriate to improve the fishery and recreation value to the extent mutually agreeable to PCWA, the U.S. Forest Service, the Bureau of Sport Fisheries and Wildlife, and the California Department of Fish and Game.

[4] The execution of the currently negotiated 2002 Amendatory Contract is pending upon the completion of the Environmental Impact Statement for CVP long-term contract renewal.

[5] FERC licensing includes regulatory review and compliance.

Table A-8. Summary of Minimum Bypass Flow Requirements[1] per MFP FERC License (in cfs)

Location	Annual Unimpaired Runoff at Folsom Lake[2] (TAF)		Period			
	Greater than	Less than	6/1 – 10/14	10/15 – 12/14	12/15 – 5/14	5/15 – 5/31
Duncan Creek Diversion Dam	0	1,000	4	4	4	4
	1,000		8	8	8	8
French Meadows Reservoir	0	1,000	4	4	4	4
	1,000		8	8	8	8
Hell Hole Reservoir	0	1,000	10	6	6	6
	1,000		20	20	10	20
South Long Canyon Diversion Dam	0	1,000	2.5	2.5	2.5	2.5
	1,000		5	5	5	5
North Long Canyon Diversion Dam	Any forecast		2	2	2	2
Ralston or Middle Fork Interbay	0	1,000	12	12	12	12
	1,000		23	23	23	23
Oxbow Powerplant[3]	Any forecast		75	75	75	75

[1] Minimum bypass flow requirements are limited by the natural inflow to the facilities.

[2] See footnote 1 of Table A-7.

[3] Measured downstream of the confluence of the Middle Fork American River and the North Fork of the Middle Fork American River.

SWRCB Water Right Decisions and Permits

The MFP supply is based on the State Water Rights Board[6] Decision 1104 (D-1104) adopted November 21, 1962, and SWRCB permits 13856 and 13858 issued January 10, 1963, for Applications 18085 and 18087, respectively. D-1104 states that 120,000 AF of PCWA's annual demands can be supplied by the MFP. However, the order contained in D-1104 and the permits do not mention the amount of 120,000 AF. Instead they specify the maximum rates of diversion and the maximum quantities that can be stored in the MFP reservoirs during any one season. It is assumed that these diversions will produce an annual yield of 120,000 AF. In wet years, the allowed diversion could produce more than 120,000 AF. The permits allow for both direct diversions and diversions to storage[7] from November 1 to July 1 each year. Thus, during the months of July through October, the only water PCWA can take from the American River is water it releases from its storage reservoirs.

As originally issued, the water rights permits provide for rediversion of MFP water only at the Auburn Dam site on the North Fork American River. In 1975, the permits were amended to add an additional point of diversion and rediversion at Folsom Dam at the diversion facilities used to supply water to SJWD. The water rights permits are also subject to stipulations and agreements entered into by PCWA with the California Department of Fish and Game (CDFG) for fish flow releases[8] and with SJWD, Sacramento Municipal Utility District (SMUD), and Sacramento in recognition of their senior water rights.

The MFP supply, as provided for in the permits, is subject to the continuing authority of the SWRCB to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of water. The MFP supply is also subject SWRCB modifications necessary to meet water quality objectives downstream from the MFP (e.g., the Delta or San Francisco Bay).

[6] SWRCB's predecessor.

[7] Diversion to storage includes water diverted to a reservoir or to a groundwater aquifer.

[8] Previously discussed in the MFP FERC license section.

1963 PCWA-PG&E Power Purchase Agreement

PCWA entered into an agreement in 1963 with PG&E regarding operation of the MFP for hydropower. Under this agreement, PCWA is required to divert based on a specified schedule, as determined by PG&E, to optimize hydropower operations. **Table A-9** lists the permissible range of diversions on a monthly basis. Since PCWA's historical usage of MFP water has been limited, the diversion schedule has not conflicted with the demand schedule. As demands increase, however, these restrictions may begin to limit the availability of MFP supply during peak water demand periods.

Table A-9. Allowable MFP Monthly Diversion Schedule per 1963 PCWA-PG&E Power Purchase Agreement

Month	Permissible Range of Diversions (Percentage of Annual Total)
January	0 to 5
February	0 to 5
March	2 to 6
April	5 to 10
May	9 to 16
June	12 to 19
July	13 to 19
August	13 to 16
September	12 to 13
October	4 to 8
November	0 to 6
December	0 to 5

PCWA-Reclamation Contract Dated February 20, 1963

In 1963, PCWA entered into an agreement with Reclamation regarding storage and release of American River water by the MFP. Reclamation's interest in MFP operations is related to its need to store and release water for CVP users. The agreement states that the end-of-September total MFP storage cannot exceed the previous year's storage if the April 1 through September 30 estimated unimpaired inflow to Folsom Lake is less than 600,000 AF. This is likely to occur in dry years and limits PCWA's storage to no more than what was used in the previous year. In addition, Reclamation may require end-of-month storage during the period of July through December to be no greater than storage at the beginning of the month, with the following exceptions:

- If total inflow to French Meadows Reservoir, including Duncan Creek diversions, exceeds 19,000 AF in November or December, and inflow to Hell Hole Reservoir exceeds 45,000 AF in November or December, then storage may be increased during each month this occurs.
- Releases from the MFP cannot exceed the maximum discharge capacity of the Hell Hole Tunnel.

PCWA-Reclamation 1970 Water Service Contract

The PCWA-Reclamation 1970 Water Service Contract provides for 117,000 AF per year of CVP entitlements at the Auburn Dam site. This contract was later amended after the construction of Auburn Dam was stopped in 1977. (More details are provided in the discussion of CVP supply.)

The PCWA-Reclamation 1970 Water Service Contract limits the amount of MFP water that PCWA can take each year similarly to the PCWA-PG&E Power Purchase Agreement. However, in a December 1988 letter agreement, Reclamation waived its rights to limit PCWA's diversions from the MFP supply each year and permit PCWA to divert up to a maximum 120,000 AF of MFP water in any year.

PCWA-Reclamation July 24, 1972 Land Purchase Agreement

In 1965, Congress authorized construction of Auburn Dam on the North Fork American River near the City of Auburn. Construction began in 1967 and was suspended in 1977 due to seismic concerns. Before construction was suspended, Reclamation sought a Land Purchase Agreement with PCWA to acquire canyon lands needed for the Auburn Dam project. As part of the Land Purchase Agreement, PCWA's 50-cfs pump station facility was removed to permit construction of Auburn Dam. The agreement does not limit PCWA's total MFP supply, but includes a provision for a substitute pumping facility or alternative water supply until Auburn Dam is completed. Water pumped by the substitute facility is limited to the supplies available to PCWA pursuant to its SWRCB water right permits. Due to limited pumping capacity, the maximum annual quantity that can be diverted through the substitute facilities is limited to 25,000 AF per year at a rate of up to 50 cfs. These limitations would soon be superseded after the construction of ARPS is completed.

Water Sales Agreements

PCWA also has water sales agreements with the following water purveyors for some of its MFP water:

- **Roseville** – 30,000 AF per year to meet water demands within the city limits and maintain an operational buffer for dry year protection (approximately 7,100 AF per year). The water sale to Roseville has been evaluated and mitigated through the WFA. According to the WFA, up to 20,000 AF per year of replacement water is to be released from MFP storage in dry years to mitigate for increased increments of American River diversions for Roseville.
- **SJWD** – 25,000 AF per year to meet the water demands of its retail and wholesale customers in Placer County and to provide long-term surface water-groundwater conjunctive use opportunities. The water sale to SJWD has been evaluated and mitigated through the WFA. No specific *WFA* constraints were imposed on this water use.
- **SSWD** – 29,000 AF per year to implement a groundwater stabilization program in Sacramento County north of the American River. The MFP water sale of 29,000 AF to SSWD was evaluated and mitigated through the WFA and an Environmental Impact Report (EIR) for the PCWA-SSWD Groundwater Stabilization Project. Limitations on the use of the 29,000 AF are detailed later in the discussion under SSWD. The purposes of this program are to:
    (1) Reduce SSWD's reliance on groundwater
    (2) Alleviate the overdraft of the groundwater basin in northern Sacramento County and southern Placer County
    (3) Provide long-term surface water-groundwater conjunctive use opportunities

The currently authorized points of diversion for these water sales are all at Folsom Dam, and diverted water is wheeled through Reclamation facilities under separate Warren Act contracts between each buyer and Reclamation.

PCWA's CVP Contract Entitlement

PCWA entered into a CVP water service contract with Reclamation on September 18, 1970, in anticipation of the construction of Auburn Dam. The original contract entitlement was for up to 117,000 AF per year of CVP water delivered at Auburn Dam or other mutually agreed location(s). Construction of Auburn Dam was suspended in 1977, and PCWA has not yet taken delivery of any water under this contract.

The subsequent 1988 PCWA-Reclamation Amendatory Contract stipulates a change in the authorized diversion point to Folsom Dam or other mutually agreed location(s). The total contract amount is limited to 35,000 AF per year for irrigation and/or M&I supplies before the completion of the Auburn Dam, according to a letter agreement attached to the Amendatory Contract. This 25-year agreement between PCWA and

Reclamation does not affect the PCWA-Reclamation Contract dated February 20, 1963 relating to operation of PCWA's MFP reservoirs.

The 1988 PCWA-Reclamation Amendatory Contract stipulates a significant restriction on the CVP supply. PCWA must fully utilize its MFP supply, to the extent that is available each year, before it is entitled to receive and use its CVP supply.

Through the CVP Long-Term Contract Renewal effort, PCWA completed a negotiation with Reclamation to further amend its CVP water service contract. The resulting February 2002 PCWA-Reclamation Amendatory Contract stipulates the same 35,000 AF per year of diversion at Folsom Dam or other mutually agreed location(s). However, the limitation regarding full use of PCWA's MFP has been removed (i.e., PCWA is not required to fully utilize its MFP supply before it is entitled to receive and use its CVP supply).

The current authorized point of diversion is at Folsom Dam. PCWA intends to use its CVP supply for M&I purposes and thus, the CVP supply is subject to the prevailing CVP M&I Water Shortage Policy.[9]

PCWA's Purveyor Specific Agreement in the WFA

In January 2000, PCWA became a signatory of the WFA. Its WFA Purveyor Specific Agreement (PSA) is discussed in two parts:

- PCWA's diversion from MFP
- PCWA's CVP delivery

PCWA's MFP Diversion

In the WFA, PCWA's baseline diversion (1995 level) is 8,500 AF per year. Under projected 2030 conditions, the maximum surface water diversion is 35,500 AF per year. The average diversion in 2002 reached 13,000 AF. This water is diverted from the American River at PCWA's ARPS. The conditions of this diversion are shown in **Table A-10**.

Table A-10. Conditions of PCWA's American River Diversion Under Its WFA PSA

Unimpaired Inflow to Folsom Lake, Mar – Nov (AF)	Maximum American River Diversion (AF)
≥ 950,000	35,500
≥ 400,000 and < 950,000	35,500
< 400,000	35,500

Under the WFA, PCWA is to release up to 27,000 AF of replacement water to the American River from reoperation of its MFP reservoirs. The purpose of the replacement water is to offset reductions in lower American River flows due to increases in PCWA's diversions during drier and driest years. The replacement water remains in the river until it reaches the confluence with the Sacramento River. However, PCWA has agreed to release the replacement water only when a water transfer partner exists below the American River outlet. PCWA's obligation to provide replacement water under its WFA PSA is summarized in **Table A-11**.

[9] The current Draft CVP Water Shortage Policy, dated September 11, 2001, stipulates a reduced allocation of irrigation water when water supply reductions are necessary. When allocation of irrigation water has been reduced below 75 percent and still further water supply reductions are necessary, both the M&I and irrigation allocations will be reduced by the same percentage increment. The M&I allocation will be reduced until it reaches 75 percent of adjusted historical use, and the irrigation allocation will be reduced until it reaches 50 percent of contract entitlement.

Table A-11. Conditions of PCWA's Replacement Water Under Its WFA PSA

Unimpaired Inflow to Folsom Lake, Mar – Nov (AF)	Amount of Replacement Water[1] (AF)
≥ 950,000	0
≥ 400,000 and < 950,000	Linearly proportional between 0 and 27,000
< 400,000	27,000

[1] The water will be made available by reoperation of PCWA's MFP reservoirs. The releases will be contingent upon the following conditions:
a. PCWA's ability to sell the released water for use below the lower American River on terms acceptable to PCWA.
b. PG&E's agreement to such reoperation until the present power purchase contract with PG&E expires in 2013.
c. PCWA's determination that it has sufficient water in its reservoirs to make the additional releases to mitigate conditions in dry years without jeopardizing the supply for PCWA's customers. [Based on historical hydrology and projected 2030 requirements as set forth in the WFA, the previous operational modeling shows that reoperation water should be available for such release and sale without drawing MFP reservoirs below 50,000 AF.]

PCWA and Reclamation have ongoing negotiations on refill conditions for the release of replacement water from storage. A current negotiated draft agreement states that refilling MFP storage vacated by the release of replacement water would not be allowed until Folsom Lake makes flood control release. This criterion suggests that the replacement water would bypass Folsom Dam, but not be re-regulated by Reclamation.

PCWA's CVP Delivery

Other WFA signatories have agreed to endorse PCWA's pursuit of a change in the diversion point of its CVP supply to a location on the Sacramento River and/or Feather River.

Groundwater

Restricted by policy stipulated in the 1994 Placer County General Plan, PCWA has not used groundwater as an M&I supply for any new development. Absent a modification in the General Plan, this practice would continue. The only possible exception is the City of Lincoln, where groundwater will be allowed as a main source of water supply to any new development under the city's own policy. PCWA's WFA PSA does not include limitations on groundwater use.

Groundwater is also used in western Placer County (PCWA Zone 5) as the source of water for agricultural and M&I supply for the town of Sheridan. However, as previously mentioned, PCWA provides only raw surface water to this area to offset a portion of commerical agricultral use, but is not responsible for the remaining groundwater supply for agricultrual and M&I purposes.

PCWA'S 2030 WATER DEMAND AND SUPPLY ESTIMATES

PCWA's 2030 water demand and supply projections in **wet**, **average** and **driest** years are presented in **Tables A-12, A-13**, and **A-14** respectively. The major difference in the tabulations for wet and average years is the allowable diversion for SSWD stipulated in the WFA. Per WFA limitations, the allowable surface water diversion from the American River and the amount of replacement water in **drier** years are between the quantities of average and driest years, linearly interpreted based on the March-through-November unimpaired inflow to Folsom Lake.

Table A-12. PCWA's 2030 Annual Demands and Supplies in Acre-Feet, per WFA Limitations on Diversion from the American River (Wet Years, 62% Occurrence Frequency)

Type of Use	Area	Water Sale	PCWA Demand	Surface Water[1]			Groundwater	Reclaimed	Unmet Demand	
				PG&E	MFP	CVP			Ag	M&I
M&I	PCWA Zone 1		85,400[2]	30,400	20,500					34,500
	Roseville	30,000			24,820[5]					
	SJWD	25,000			22,691[6]					
	SSWD	29,000			29,000					
Ag[3]	PCWA Zone 1		70,000	70,000						
	PCWA Zone 5		70,000		15,000		51,000	4,000		
Replace-ment Water	PCWA Portion				0					
	Roseville Portion				0					
Subtotal		84,000	225,400	100,400	112,011	0[7]	51,000	4,000	0	34,500
Remaining Amount[4]				0	7,989	35,000				
Total Water Rights/Entitlements				100,400	120,000	35,000				

[1] Assumed 0 percent PG&E supply deficiency and 6 percent CVP deficiency. See Attachment A for details.
[2] From the slow-growth projection in the PCWA 2003 Water System Infrastructure Plan. A future realized growth greater than the assumed slow-growth projection would result in additional unmet demand.
[3] From discussion with PCWA staff. PCWA plans to deliver a total of 85,000 AF per year to agricultural use in Zones 1 and 5. Zone 1 agricultural users can only be served by using surface water.
[4] Due to WFA limitations, assumed PG&E and CVP deficiency, and estimated demand.
[5] See Table A-23 for details.
[6] See Attachment B for details.
[7] No existing and currently approved facilities available to divert, treat and convey water under this entitlement.

Table A-13. PCWA's 2030 Annual Demands and Supplies in Acre-Feet, per WFA Limitations on Diversion from the American River (Average Years, 24% Occurrence Frequency)

Type of Use	Area	Water Sale	PCWA Demand	Surface Water[1]			Groundwater	Reclaimed	Unmet Demand	
				PG&E	MFP	CVP			Ag	M&I
M&I	PCWA Zone 1		85,400[2]	30,046	20,854					34,500
	Roseville	30,000			28,340[5]					
	SJWD	25,000			22,691[6]					
	SSWD	29,000			0					
Ag[3]	PCWA Zone 1		70,000	68,346	1,654					
	PCWA Zone 5		70,000	0	12,992		53,008	4,000		
Replace-ment Water	PCWA Portion				0					
	Roseville Portion				0					
Subtotal		84,000	225,400	98,392	86,531	0[7]	53,008	4,000	0	34,500
Remaining Amount[4]			0	2,008	33,469	35,000				
Total Water Rights/Entitlements				100,400	120,000	35,000				

[1] Assumed 2 percent PG&E supply deficiency and 17 percent CVP deficiency. See Attachment A for details.
[2] From the slow-growth projection in the PCWA 2003 Water System Infrastructure Plan. A future realized growth greater than the assumed slow-growth projection would result in additional unmet demand.
[3] From discussion with PCWA staff. PCWA plans to deliver a total of 85,000 AF per year to agricultural use in Zones 1 and 5. Zone 1 agricultural users can only be served by using surface water.
[4] Due to WFA limitations, assumed PG&E and CVP deficiency, and estimated demand.
[5] See Table A-24 for details.
[6] See Attachment B for details.
[7] No existing and currently approved facilities available to divert, treat and convey water under this entitlement.

Table A-14. PCWA's 2030 Annual Demands and Supplies in Acre-Feet, per WFA Limitations on Diversion from the American River (Driest Years, 2% Occurrence Frequency)

Type of Use	Area	Water Sale	PCWA Demand	Surface Water[1]			Groundwater	Reclaimed	Unmet Demand	
				PG&E	MFP	CVP			Ag	M&I
M&I	PCWA Zone 1		85,400[2]	25,616	25,284					34,500
	Roseville	30,000			21,560[5]					
	SJWD	25,000			10,000[6]					
	SSWD	29,000			0					
Ag[3]	PCWA Zone 1		70,000	47,676	10,216				12,108	
	PCWA Zone 5		70,000	0	0		66,000	4,000		
Replace-ment Water	PCWA Portion				27,000[8]					
	Roseville Portion				20,000[8]					
Subtotal		84,000	225,400	73,292	67,060	0[7]	66,000	4,000	12,108	34,500
Remaining Amount[4]			0	27,108	52,940	35,000				
Total Water Rights/Entitlements				100,400	120,000	35,000				

[1] Assumed 27 percent PG&E supply deficiency and 43 percent CVP deficiency. See Attachment A for details.
[2] From the slow-growth projection in the PCWA 2003 Water System Infrastructure Plan. A future realized growth greater than the assumed slow-growth projection would result in additional unmet demand.
[3] From discussion with PCWA staff. PCWA plans to deliver a total of 85,000 AF per year to agricultural use in Zones 1 and 5. Zone 1 agricultural users can only be served by using surface water and thus, the deficiency would require extra ordinary conservation.
[4] Due to WFA limitations, assumed PG&E and CVP deficiency, and estimated demand.
[5] See Table A-25 for details.
[6] See Attachment B for details.
[7] No existing and currently approved facilities available to divert, treat, and convey water under this entitlement.
[8] PCWA would reoperate MFP reservoirs for releasing the replacement water from storage only if there is a willing buyer at the mouth of the American River. The release of replacement water is assumed not to be counted against the allowable120,000 AF per year of MFP diversion for consumptive use.

Demand Estimate

The demand within PCWA's Zone 1 treated water supply was recently estimated in PCWA's 2003 Water Systems Infrastructure Plan (in draft) based on land use information from the Sacramento Area Council of Government, Placer County, and the cities of Auburn, Rocklin, and Lincoln. Build-out demand is close to 116,800 AF per year, and three growth rates were assumed to bring the development to the build-out condition in 30, 40, and 50 years. The demands in year 2030 are from 116,800, 100,800, and 85,400 AF per year for fast, medium, and slow growth projections, respectively.

Without major augmentation in water treatment and diversion facilities, PCWA currently plans to meet the demand of slow-growth projection (85,400 AF per year for M&I use) with their remaining water rights and contract entitlements. However, the demand would be greater if the realized growth is greater than the assumed slow-growth scenario.

Based on the estimates in PCWA's 1998 *West Placer Groundwater Management Plan* (in draft), the total agricultural demands in Zones 1 and 5 are 70,000 and 70,000 AF per year, respectively. PCWA provides about 85,000 AF per year of raw water supplies to agricultural demands in Zone 1 and Zone 5. PCWA plans to maintain the same level of raw water supply to these regions in the future.

Supply Estimate

The 2030 supply estimate is based on existing and currently approved facilities and operations. In particular, PCWA would complete the permanent ARPS and divert 35,500 AF per year from the North Fork American River, and the maximum diversion rate would be 100 cfs.

PG&E Drum-Spaulding Water Supply

Currently, PCWA has fully used the entitlement under its contract with PG&E using water from the Drum-Spaulding system. In the future, PCWA will continue using this water supply in full. The supply is relatively reliable because PG&E has senior water rights in the Yuba and Bear River basins with storage facilities.

MFP Water Supply

PCWA's water rights to consumptively use up to 120,000 AF per year are junior to Reclamation's CVP water rights. However, Water Code Section 11460 regarding area-of-origin states the following:

> *In the construction and operation by the department [Reclamation] of any project under the provisions of this part a watershed or area wherein water originates, or an area immediately adjacent thereto which can conveniently be supplied with water therefrom, shall not be deprived by the department directly or indirectly of the prior right to all of the water reasonably required to adequately supply the beneficial needs of the watershed, area, or any of the inhabitants or property owners therein.*

With this statute, PCWA has a higher priority for using MFP water in PCWA's approved Place of Use (POU) compared to CVP exports at the Delta. Because of the regulating capacity of MFP reservoirs, and the protection under the area-of-origin statute, it is reasonable to assume the full amount of allowable MFP diversions would be available in all hydrologic conditions.

CVP Water Supply

The CVP water supply is subject to Reclamation's CVP Shortage Policy. According to the simulation results from the September 2002 CALSIM II Benchmark Study for 2020[10] level of demand, the average deficiency rates for wet, average, drier, and driest years are 6, 17, 25, and 43 percent, respectively (see **Attachment A**).

Although PCWA's CVP contract entitlement is exercisable, PCWA does not currently have approved facilities for diversion and treatment. Therefore, the CVP water supply is assumed zero under the current criterion to include only projects and actions that are currently authorized, funded, permitted, and/or highly likely to be implemented.

Facility Capacity

PCWA's currently approved or constructed water treatment plants are able to treat 51,900 AF per year of water supply to M&I use in Zone 1 with almost no extra capacity for additional supply. Therefore, the unmet demand of 34,500 AF per year would require about 65 million gallons per day (mgd) of treatment capacity, using a factor of two for converting the average-day demand to the max-day demand.

Balancing 2030 Demand and Supply and Increasing Water Supply Reliability

Based on the above analysis, PCWA must acquire additional water supplies to alleviate its water shortage. PCWA's current policy is to exercise its water rights and contract entitlements in full before considering other water sources such as water purchases from other purveyors. Therefore, PCWA intends to exercise its CVP contract entitlement of 35,000 AF per year to satisfy the unmet demand in this study. Combined with currently allocated MFP water rights (PCWA's diversion of 35,500 AF per year at the ARPS and water sales agreements of up to 84,000 AF per year in total), PCWA would have 500 AF of operational buffer.

The full amount of 35,000 AF per year from PCWA's CVP contract entitlement is slightly greater than the estimated water shortage. However, the CVP entitlement is subject to Reclamation's CVP Shortage Policy.[11]

[10] CALSIM Benchmark Study for a 2030 Level of Demand is not currently available.

Thus, further reallocation of surface water supply among different water uses and conservation would be required in some years. In years that CVP contract entitlement is available in full, the additional surface water could be used in lieu of groundwater pumping in Zone 5 to further contribute to stabilizing the local groundwater basin.

As previously mentioned, PCWA would not have an available water treatment facility for this additional 35,000 AF per year of surface water supply. Therefore, to meet the max-day demand, PCWA would need a treatment facility with a capacity[12] of 65 mgd and associated pipelines for distribution.

SACRAMENTO SUBURBAN WATER DISTRICT

The needs assessment for SSWD includes discussions on the legal framework governing SSWD, SSWD water system and water sources, and estimates of SSWD's 2030 water demand and supply.

LEGAL FRAMEWORK GOVERNING SSWD

SSWD (see **Figure A-3**) was formed as the result of the consolidation of Northridge Water District (NWD) and Arcade Water District (AWD), effective February 1, 2002. SSWD was organized and operates under the County Water District Law of the California Water Code (Division 12, commencing with Water Code section 30,000). Water Code section 31,001 gives SSWD "the power generally to perform all acts necessary to carry out fully the provisions of this division." Water Code section 31,004 provides authority to make contracts to carry out the purposes of the district. Water Code section 31,005 provides authority to construct works. Water Code section 31,020 provides authority to "do any act necessary to furnish sufficient water in the district for any present or future beneficial use." Water Code section 31,022 authorizes SSWD to operate water rights, works, property, and rights to convey and make use of water for any purpose authorized by the County Water District Law. Water Code section 31,040 authorizes a district to take any property necessary to carry out the business of the district. Under Water Code section 31,041, a district may hold, use, enjoy, lease,, or dispose of property within or without the district necessary to the full exercise of its powers. Under Water Code section 31,042, a district may construct, purchase, lease or otherwise acquire works, water rights, lands, rights and privileges useful or necessary to convey, supply, store or otherwise make use of water for any purpose authorized by this division. Under Water Code section 31,047, a district may control, distribute, store, spread, sink, treat, purify, recapture, and salvage any water for the beneficial use of the district. Under Water Code section 31,048, a district may cooperate, act in conjunction and contract with the State of California, or any agency thereof, and municipalities, public and private corporations of any kind, and persons with respect to the distribution of water and the construction of any works, the acquisition of any property, or the doing of any act with respect thereto. Water Code section 31,049 authorizes a district to make and perform any agreement with the State of California, or any agency thereof, any public or private corporation of any kind, and any person, or any of them, for the joint construction, acquisition, disposition or operation of any property or work of a kind that might be constructed, acquired, dispose of or operated by the district.

Although the County Water District Law essentially requires SSWD to serve planned growth within its service area, SSWD does not control local land use decisions creating the need for water supply. Rather, under California law, land use decisions are made only by elected boards of supervisors and city councils. SSWD, then, is subject to the traditional understanding of water suppliers under California law to be a "duty to serve" new development. As reflected in case law, this obligation has been understood to require water suppliers to find and develop any new water supplies needed to meet projected growth levels in their service areas. (See

[11] This CVP water supply is, and would continue to be, subject to deficiencies of up to 50 percent. The 25 percent maximum deficiency for M&I supply proposed in the *Draft M&I Water Shortage Policy* [September 2001] has not yet been adopted.

[12] Using a factor of 2 to convert the average-day demand to the max-day demand, and rounded up to the nearest capacity by a 5-mgd increment.

Swanson v. Marin Municipal Water Dist. (1976) 56 Cal.App.3d 512, 524 (water district has a "continuing obligation to exert every reasonable effort to augment its available water supply in order to meet increasing demands"); Glenbrook Development Co. v. City of Brea (1967) 253 Cal.App.2d 267, 277 ("county water district has a mandatory duty of furnishing water to inhabitants within the district's boundaries"); see also Lukrawka v. Spring Valley Water Co. (1915) 169 Cal. 318, 332; Building Industry Assn. of Northern California v. Marin Municipal Water Dist. (1991) 235 Cal.App.3d 1641, 1648-1649; Slater, California Water Law and Policy (Michie Publications 1996), vol. 2, p. 14-11 (refers to water districts' "duty to serve").

Consistent with this traditional obligation, a "distributor of a public water supply" can refuse to supply water to new development only if the distributor "finds and determines that the ordinary demands and requirements of water customers cannot be satisfied without depleting the water supply of the distributor to the extent that there would be insufficient water for human consumption, sanitation, and fire protection." (Water Code, § 350.)

SSWD is also subject to the Urban Water Management Planning Act (Water Code, § 10610, et seq.), as amended in 2001 in response to the California Legislature's concern that California's water supply agencies might not be engaged in adequate long-term planning. That Act requires SSWD, as an "urban water supplier," to maintain an "urban water management plan" that must identify existing water supply and demand, and must identify any new water sources required to satisfy demand as projected at least 20 years into the future. The projected 20-year supply must account for "average, single-dry, and multiple-dry water years."

Under California Water Code sections 10910 through 10912, as amended in 2001 (also known as S.B. 610), SSWD must consult with Sacramento County when the County proposes development projects of a certain magnitude (e.g., residential projects with more than 500 dwelling units or a retail or business establishment employing more than 1,000 persons or having more than 250,000 square feet). SSWD must respond to these requests either by identifying the water sources available to serve such development, or by identifying the plans it would follow to obtain new water supplies for such developments. In the latter instance, such plans may include information concerning: (1) the estimated total costs, and the proposed method of financing the costs, associated with acquiring additional water supplies; (2) all federal, state, and local permits, approvals, or entitlements that are anticipated to be required in order to acquire and develop the additional supplies; and (3) the estimated time frames within that SSWD expects to be able to acquire additional water supplies. (Water Code, § 10911, subdivision (a).)

SSWD is also subject to 2001 state legislation commonly known as the "Kuehl Bill" (SB 221), after its author State Senator Sheila Kuehl. (See Government Code, § 66473.7.) That bill requires any city or county considering the approval of a proposed tentative subdivision map for more than 500 units to consult with the relevant water supply agency to determine whether adequate water is available for the proposed subdivision, as well as for "existing and planned future uses" (including agriculture) over the next 20 years, under "normal, single-dry and multiple-dry year" scenarios. This new legal scheme, like the Urban Water Management Planning Act, requires SSWD to constantly take the steps that will be necessary to accommodate the growth planned for the next 20 years by Sacramento County within the SSWD service area.

SSWD'S WATER SYSTEM

The water systems of NSA and ASA are discussed separately.

NSA

SSWD uses the diversion and treatment facilities of SJWD for surface water delivery to the NSA. There are 31 active groundwater wells with a total capacity about 27,500 gallon per minute (gpm).

The NSA system has two primary transmission mains that are part of the Cooperative Transmission Pipeline/Northridge Transmission Pipeline (CTP/NTP). The primary east-west link of the CTP/NTP consists of about 40,000 feet of 48-inch pipe located on Antelope Road. A 30-inch-diameter, 4,000-foot section of the

CTP/NTP parallel Highway 80 conveys surface water to the Southeast and Arvin areas. Currently, SSWD is installing a 36-inch transmission main south on Walerga Road from terminus of the CTP/NTP at Antelope Road. An interconnection into the ASA (North Highlands) may be constructed along this addition.

ASA

ASA includes two major sub-areas: North Highlands and Town and Country. There is currently no surface water delivered to the North Highland sub-area and thus, the demand is supplied by using groundwater wells. In Town and Country sub-area, the Arcade infiltration gallery includes 11 infiltration wells to divert American River water. The infiltration gallery was reactivated in July 1995 to augment system pressures in the southeastern portion of the sub-area. SSWD is currently negotiating with Sacramento for providing surface water to this sub-area. There are 64 wells in the ASA and their aggregated groundwater production capacity is about 48,250 gpm.

SSWD is currently replacing the distribution system in the ASA as part of an ongoing Capital Replacement and Improvement Program. The new transmission mains consist of about 108,500 feet of 18- and 36-inch pipe providing connections throughout the ASA.

SSWD'S WATER SOURCES

SSWD does not own any water rights, but has entitlements through water sale contracts with other agencies.

Surface Water Contract Entitlements

SSWD's surface water supplies include the surface water delivered under SSWD's water sale agreement with PCWA and water that may be diverted by SSWD under a 1964 agreement that authorized AWD to divert a portion of Sacramento's American River water rights water. Historically, SSWD relied primarily on groundwater for delivery to its customers. **Table A-15** summarizes SSWD's surface water contract entitlements.

Table A-15. SSWD's Surface Water Contract Entitlements

Water Source	Maximum Amount (AF per year)		Point of Diversion	Place of Use
	Wet/Average Years	Drier/Driest Years		
MFP	29,000	29,000	Folsom Dam	Areas within MFP's POU in Sacramento County
Sacramento's American River water rights	26,064	3,500	American River	Area D within Sacramento's American River POU
TOTAL	58,040	32,500		

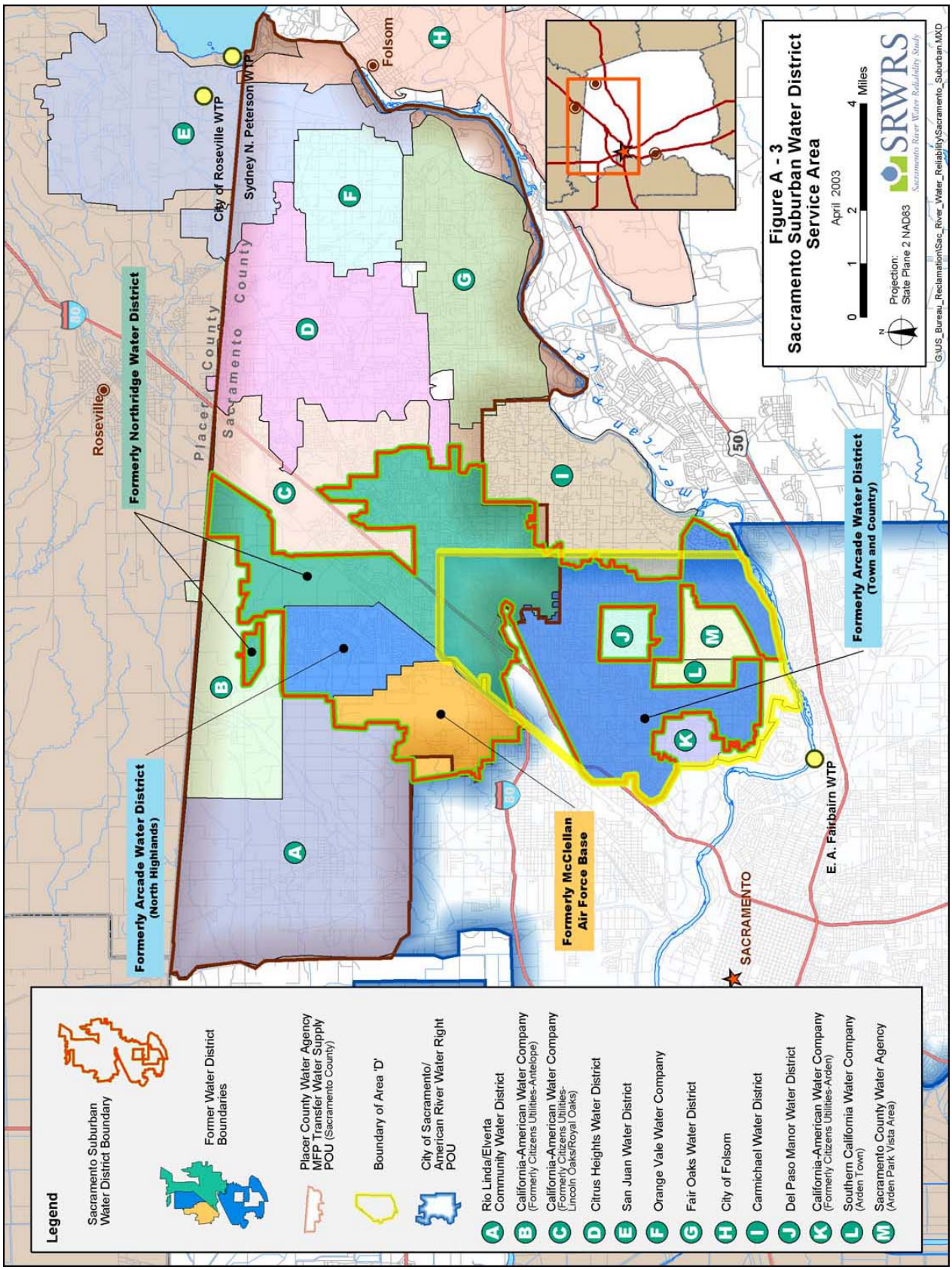

Figure A-3. SSWD Service Area and Vicinity

PCWA-SSWD Water Sale Agreement

This water sale facilitates the groundwater stabilization project in northern Sacramento County and southern Placer County. The latest agreement between PCWA and former NWD was signed on June 1, 2000, after the SWRCB issued the May 24, 2000, water right order extending the POU for PCWA's MFP water rights to that part of Sacramento County inclusive of NWD's service area (NSA) and a portion of AWD's service area (ASA). Surface water has been delivered within NSA under this agreement since June 1, 2000.

Although these supplies are not available in all years (due to hydrologic variability), this program reduces SSWD's historical reliance on groundwater, alleviates overdraft of the groundwater basin in northern Sacramento County and western Placer County, and provides for long-term conjunctive use opportunities. This surface water is diverted through Reclamation facilities at Folsom Lake, treated at SJWD's Sidney N. Peterson WTP (Peterson WTP), and delivered to the SSWD service area (and potentially to others in the future) through the existing Cooperative Transmission Pipeline and Northridge Conveyance Transmission Pipeline.

The PCWA-SSWD water sale agreement stipulates a gradually increased schedule of annual delivery that would reach the maximum 29,000 AF in 2014. The water would be delivered through Reclamation facilities at Folsom Dam and thus, a Warren Act contract between SSWD and Reclamation is needed.

The operation constraints associated with this agreement are largely set forth by the WFA and the May 24, 2000, SWRCB water rights order, as described below.

SSWD's (Former NWD's) Purveyor Specific Agreement in the WFA and Associated SWRCB Order

The May 24, 2000, SWRCB water rights order for the change in POU of PCWA's MFP water stipulates that water deliveries to the extended POU for SSWD will need to satisfy the provisions in all related settlement agreements with DWR, Reclamation, and other local water purveyors and individuals. Most of the provisions are stipulated in the WFA, with the exception of refill criteria from the settlement agreement with DWR. The refill criteria state that when Term 91[13] is in effect, PCWA will deliver to SSWD only water previously stored in the MFP reservoirs, and PCWA will be restricted from refilling any of its MFP reservoir storage vacated through a previous release of stored water for delivery to SSWD.

As stipulated in the SSWD-PCWA water sale agreement, the WFA, and May 24, 2000, SWRCB water rights order, diversions by SSWD are, and would continue to be, subject to the following limitations:

- A schedule of maximum annual water sale amounts, reaching the full 29,000 AF in year 2014.
- In years 2000 through 2009, the diversion would be allowed only if the March-through-November American River unimpaired flow into Folsom Lake were greater than 950,000 AF.
- If SSWD acquires a Sacramento River diversion in years 2000 through 2009, SSWD's ability to divert American River water would be immediately reduced and limited when the March-through November American River unimpaired flow into Folsom Lake were greater than 1,600,000 AF.
- Beyond year 2010 (regardless of the development of a Sacramento River diversion), the American River diversion would be allowed only if the March-through-November American River unimpaired flow into Folsom Lake were greater than 1,600,000 AF.

Table A-16 summarizes the above operation restrictions. The approved POU for this water supply includes SSWD's NSA (including the recently annexed McClellan Air Force Base [AFB]) and ASA (North Highlands),

[13] Term 91 occurs when State Water Project (SWP) and CVP need to release from their reservoir storage to satisfy in-basin demands.

California-American Water Company or Cal-American (Antelope and Royal Oaks/Lincoln Oaks service areas), Rio Linda/Elverta Community Water District (RL/ECWD), SJWD, Fair Oaks Water District (FOWD), Citrus Heights Water District (CHWD), Orange Vale Water Company (OVWC), and City of Folsom (north of American River). The former NWD's WFA PSA is currently being revised to reflect the merge with AWD to form SSWD.[14]

Table A-16. Conditions of SSWD's Diversion from the American River Under the Former NWD's WFA PSA

Unimpaired inflow to Folsom Lake, March – November (AF)	Maximum Annual Diversion from the American River (AF)	
	First 10-Year Period[1]	After 10-Year Period
≥ 1,600,000	29,000[2]	29,000[3]
≥ 950,000 and < 1,600,000	29,000[2]	0[3]
≥ 400,000 and < 950,000	0	0[3]
< 400,000	0	0[3]

[1] The 10-year period after the WFA was signed; this period may be extended up to 2 additional years by agreement of the parties to the WFA.

[2] In the December-through-February period following a March-through-November period with unimpaired inflow into Folsom Lake of less than 950,000 AF, water shall not be delivered to SSWD when and after water is released from Folsom Lake for flood protection.

[3] Assuming SSWD can take delivery of Sacramento River water through a Sacramento Pipeline within the 10-year period; otherwise, the SWRCB will hold a hearing if requested by SSWD, Sacramento, County of Sacramento, Friends of the River, Sierra Club, or Save the American River Association. The hearing would not consider the compromise by the parties in the WFA.

SSWD-Sacramento Water Sale Agreement

The former AWD (now SSWD) entered into a 1964 agreement with Sacramento authorizing up to 26,064 AF of raw water diversion from the American River for use in the SSWD's ASA, Town & Country sub-area. This place of use is referred as Area "D" of Sacramento's American River water rights POU (American River POU) in the 1964 agreement. As illustrated in **Figure A-3,** Area "D" includes the service areas of SSWD (most of ASA), Del Paso Manor Water District (DPMWD), Cal-American (Arden), Southern California Water Company or SCWC (Arden Town), Sacramento County Water Agency or SCWA (Arden Park Vista), and a portion of Carmichael Water District (CWD).

The Northridge Park County Water District (predecessor to the former NWD) also entered into a 1980 agreement with Sacramento authorizing up to 9,023 AF per year of raw water diversions from the American River for use in a portion of the NSA that lies within Sacramento's existing American River POU. The conditions necessary for that agreement to be effective were not fulfilled; thus, that agreement is not included in this study.

SSWD's (Former AWD's) Draft Purveyor Specific Agreement in the WFA

AWD was not a signatory of the WFA and did not have a PSA. However, a **draft** PSA is currently under review by the Water Forum Successor Effort. The draft PSA stipulates that the contract entitlement would be diverted at Sacramento's Fairbairn WTP, the American Well System, and/or another point of diversion on the American River below Nimbus Dam established pursuant to SSWD's contract assignment from Sacramento. Diversions under this draft PSA would be subject to the following limitations:

- **Most Years (or Wet/Average):** As it applies to SSWD (ASA), "Most Years" are defined as time periods when the flow bypassing Sacramento's diversion at Fairbairn WTP exceeds the Hodge Flow criteria.[15]

[14] As a separate entity in 2000, AWD was not a signatory of the WFA and did not have a PSA.

[15] At the end of a multiyear lawsuit (Environmental Defense Fund et al. v. East Bay Municipal Utility District [EBMUD]), Presiding Judge Richard Hodge issued a decision on balancing fishery needs with EBMUD's contractual entitlement to American River water. These flow criteria on the Lower American River have come to be known as the

During these years, SSWD may use up to 26,064 AF per year of surface water diverted from the American River to meet water demands within the Town and Country subarea and potentially for other conjunctive use purposes.

- **Drier Years:** As it applies to SSWD (ASA), "Drier Years" are defined as time periods when the flow bypassing the City's diversion at Fairbairn WTP does not exceed the Hodge Flow criteria. During these years, SSWD may use up to 3,500 AF per year of surface water diverted from the American River to meet water demands within the Town and Country subarea and potentially for other conjunctive use purposes.

- **Driest Years:** As it applies to SSWD (ASA), "Driest Years" are defined as years when the March-through-November unimpaired inflow to Folsom Lake is less than 400,000 AF. During these years, SSWD may use up to 3,500 AF per year of surface water diverted from the American River to meet water demands within the Town and Country subarea and potentially for conjunctive use purposes. It is recognized that for these years there may not be sufficient water available to provide the agreed-on diversions and expected flows to the mouth of the American River. In such years, SSWD would participate in a conference with other stakeholders to decide how available water should be managed.

Section 215 Water

SSWD has historically used surface water supplies through Section 215 (i.e., unstorable water during flooding conditions). This water source was not considered in the SRWRS due to its intermittent nature.

Groundwater

Both the NSA and ASA overlie the groundwater basin and have access to groundwater. Both service areas have sufficient extraction capacity to meet projected demands and historically, have fully relied on groundwater.

SSWD'S 2030 WATER DEMAND AND SUPPLY ESTIMATES

SSWD's 2030 water demand and supply projections in **wet**, **average**, and **drier/driest** years are presented in **Tables A-17, A-18, and A-19**, respectively.

Demand Estimate

The American River Basin Cooperating Agencies[16] (ARBCA) Regional Water Master Plan (RWMP) provides the latest demand estimates for SSWD (ASA and NSA), water purveyors within the POU of the SSWD-PCWA water sale agreement, and water purveyors within Area "D". These areas are largely developed and demands have already been established. The max-day demand in these areas totals 244 mgd, using a factor of 2 for converting the average-day demand to the max-day demand.

Hodge Flows. While Judge Hodge's decision applies only to parties to that lawsuit, the Water Forum considered the same standards for any water district that was found to have reasonable and feasible alternatives. The Water Forum also recognized that some agencies, such as those at higher elevations, have no reasonable and feasible alternatives to increased American River diversions in most years and therefore probably would not be held to the Hodge standard. Per the WFA, "wet/average" years for Sacramento and SSWD (ASA) are defined as time periods when flows bypassing the Fairbairn WTP diversion exceed the Hodge flows. Hodge flows are 2,000 cfs from October 15 through February, 3,000 cfs from March through June, and 1,750 cfs from July through October 14.

[16] Formed by water purveyors in southern Placer County and northern Sacramento County to initiate work on implementation of the regional conjunctive use program envisioned by the WFA. The objective of this effort, referred to as the Regional Water Master Plan, was to develop equitable, cost-effective water resource management strategies for enhancing water supply reliability and operational flexibility for water users of Folsom Lake, the lower American River, and the connected groundwater basin.

Table A-17. SSWD's 2030 Annual Demands and Supplies in Acre-Feet (Wet Years, 62% Occurrence Frequency)

Type of Use	Area	Demand[1]	Surface Water Sources[2]		Groundwater
			MFP	Sacramento	
M&I	MFP POU				
	NSA	20,997	20,997		0
	ASA (North Highland)	5,224	5,224		0
	Cal-American (Antelope and Royal Oaks/Lincoln Oaks)	19,908	2,779		17,129
	RL/ECWD	18,688	0		18,688
	Subtotal in MFP POU	64,817	29,000		35,817
	Area "D"				
	ASA (Town and County)	17,986		16,640	0
	Cal-American (Arden)	1,565		1,565	0
	DPMWD	3,340		3,340	0
	SCWC (Arden Town)	1,373		1,373	1,346
	SCWA (Arden Park Vista)	3,146		3,146	0
	Subtotal in Area D	27,410		26,064	1,346
Subtotal		92,227	29,000	26,064	37,163
Remaining Amount[3]			0	0	
Total Entitlements			29,000	26,064	

[1] From ARBCA April 2001 *Regional Water Master Plan, Phase II, TM 2*.
[2] The distribution of surface water supply among different agencies shown in the table represents a possible scenario. Actual uses may vary.
[3] Due to WFA limitations, assumed PG&E and CVP deficiency, and estimated demand.

Table A-18. SSWD's 2030 Annual Demands and Supplies in Acre-Feet (Average Years, 24% of the Years)

Type of Use	Area	Demand[1]	Surface Water Sources[2]		Groundwater
			MFP	Sacramento	
M&I	MFP POU				
	NSA	20,997	0		20,997
	ASA (North Highlands)	5,224	0		5,224
	Cal-American (Antelope and Royal Oaks/Lincoln Oaks)	19,908	0		19,908
	RL/ECWD	18,688	0		18,688
	Subtotal in MFP POU	64,817	0		64,817
	Area "D"				
	ASA (Town and County)	17,986		16,640	0
	Cal-American (Arden)	1,565		1,565	0
	DPMWD	3,340		3,340	0
	SCWC (Arden Town)	1,373		1,373	1,346
	SCWA (Arden Park Vista)	3,146		3,146	0
	Subtotal in Area D	27,410		26,064	1,346
Subtotal		92,227	29,000	26,064	66,163
Remaining Amount[3]			29,000	0	
Total Entitlements			29,000	26,064	

[1] From ARBCA April 2001 *Regional Water Master Plan, Phase II, TM 2*.
[2] The distribution of surface water supply among different agencies shown in the table represents a possible scenario. Actual uses may vary.
[3] Due to WFA limitations, assumed PG&E and CVP deficiency, and estimated demand.

Table A-19. SSWD's 2030 Annual Demands and Supplies in Acre-Feet (Drier Years [14% Occurrence Frequency] and Driest Years [2% Occurrence Frequency])

Type of Use	Area	Demand[1]	Surface Water Sources[2]		Groundwater
			MFP	Sacramento	
M&I	MFP POU				
	NSA	20,997	0		20,997
	ASA (North Highlands)	5,224	0		5,224
	Cal-American (Antelope and Royal Oaks/Lincoln Oaks)	19,908	0		19,908
	RL/ECWD	18,688	0		18,688
	Subtotal in MFP POU	64,817	0		64,817
	Area "D"				
	ASA (Town and County)	17,986		3,500	14,486
	Cal-American (Arden)	1,565		0	1,565
	DPMWD	3,340		0	3,340
	SCWC (Arden Town)	1,373		0	1,373
	SCWA (Arden Park Vista)	3,146		0	3,146
	Subtotal in Area D	27,410		3,500	23,910
Subtotal		92,227	0	3,500	88,727
Remaining Amount[3]			29,000	0	
Total Entitlements			29,000	3,500	

[1] From ARBCA April 2001 *Regional Water Master Plan, Phase II, TM 2*.
[2] The distribution of surface water supply among different agencies shown in the table represents a possible scenario. Actual uses may vary.
[3] Due to WFA limitations, assumed PG&E and CVP deficiency, and estimated demand.

Supply Estimate

The 2030 supply estimate is based on existing and currently approved facilities and operations. In particular, SSWD would not have access to water supply from the Sacramento River for the entitlement of SSWD-PCWA water sale agreement; however, through Sacramento's diversion facilities, SSWD would have access to surface diversion stipulated in the 1964 agreement with Sacramento.

Surface Water

SSWD's surface water contracts with PCWA and Sacramento are both based on the other agencies' water rights and agreements relating thereto. Assuming compliance with those terms and conditions, these contracts are considered relatively secure sources of supply. The diversions would also be subject to WFA limitations if diverted from the American River; that is, SSWD would only divert the 29,000 AF per year of contract entitlement with PCWA in wet years.

Groundwater

In years when there is insufficient surface water available to meet demands within the NSA and/or ASA, groundwater would be extracted. The draft SSWD WFA PSA is silent on the maximum allowable annual groundwater extraction. In addition, the WFA assumes that after the first 10 years, SSWD would be able to divert the 29,000 AF of contract entitlement only during wet years. However, as prescribed in the WFA, the long-term sustainable yield of the North Area[17] groundwater basin is about131,000 AF per year. Along with all other WFA signatories within the North Area groundwater basin, SSWD would work with the Sacramento Groundwater Authority (SGA)[18] to maintain that yield.

[17] North Area is the area in northern Sacramento County bounded by the County line, the American River, and the Sacramento River.
[18] The SGA is a joint powers authority formed pursuant to the recommendation of WFA and charged with the protection and regulation of the groundwater basin underlying northern Sacramento County.

Facility Capacity

SSWD's water supply could be 100 percent on groundwater. In wet years, an additional surface water supply of 29,000 AF could be diverted from the American River at Folsom Dam, using shoulder capacity of SJWD's Peterson WTP. SSWD is also negotiating agreement with Roseville to use shoulder capacity of Roseville's WTP by Folsom Lake to water delivery. As previously stated, through Sacramento's diversion facilities, SSWD would have access to surface diversion stipulated in the 1964 agreement with Sacramento.

Balancing the 2030 Demand and Supply and Increasing Water Supply Reliability

Based on the above analysis, SSWD has no gap between estimated demand and available supply, assuming groundwater would be fully accessible as an alternative source of water supply. However, SSWD has 29,000 AF of contract entitlement in non-wet years that can be further used for groundwater stabilization purposes, enhancing water supply reliability.

The WFA supports SSWD in seeking an alternate diversion from the Sacramento River for non-wet-year delivery of this 29,000 AF contract entitlement with PCWA; however, WFA limitations on SSWD's diversion from the American River would potentially be renegotiated if a Sacramento River diversion cannot be realized. Thus, for the SRWRS, SSWD intends to exercise its remaining contract entitlement of 29,000 AF per year in non-wet years to increase its water supply reliability. In addition, SSWD would request firm capacity of 15 mgd if diverting from the Sacramento River for additional system redundancy in dry years.

CITY OF ROSEVILLE

The needs assessment for Roseville includes discussions on the legal framework governing Roseville, Roseville water system and water sources, and estimates of Roseville's 2030 water demand and supply.

LEGAL FRAMEWORK GOVERNING ROSEVILLE

Roseville began municipal water service within the city in the early 1930s through purchase of a private water company that provided city service. Since that time, Roseville has maintained and expanded the facilities required to provide water service within its service area. The water system meets full domestic, irrigation, and fire protection demands with potable water in the service area. Raw water deliveries are not made by the utility.

Roseville is the land use authority that governs development within its service area. Development must be consistent with the General Plan developed and approved by the Roseville City Council or a project could be considered with a General Plan amendment. As with initial development, any changes to this plan address the issue of adequate water supply.

Roseville is also subject to the Urban Water Management Planning Act (Water Code, § 10610 et seq.) as amended in 2001 in response to the California Legislature's concern that California's water supply agencies might not be engaged in adequate long-term planning. That act requires Roseville, as an "urban water supplier," to maintain an "urban water management plan" that must identify existing water supply and demand, and must identify any new water sources required to satisfy demand as projected at least 20 years into the future. The projected 20-year supply must account for "average, single-dry, and multiple-dry water years."

In predicting 20-year water demands, Roseville relied on data from state and local service area population projections. Through this process, Roseville has identified water sources necessary to serve such planned development, and necessary mitigation to reduce the "growth-inducing" effects of obtaining new water supplies.

Under California Water Code sections 10910 through 10912, as amended in 2001 (also known as S.B. 610), Roseville must determine water supply adequacy for development projects of a certain magnitude (e.g., residential projects with more than 500 dwelling units or a retail or business establishment employing more than 1,000 persons or having more than 250,000 square feet).

City of Roseville General Plan

With respect to water supply demands in the developing areas of Roseville, Roseville must operate within the regulatory framework created by its General Plan, which generally disfavors any reliance on groundwater for development and prefer to use this resource only for backup supplies. Proponents of development projects are required to develop their own surface water supply and backup groundwater supplies.

ROSEVILLE'S WATER SYSTEM

Roseville service area (see **Figure A-4**) is within Placer County near the boundary of Sacramento County. The service area is broken into four separate pressure zones due to the topography of the service area including the primary pressure zone covers a majority of the service area, a reduced pressure zone on the west side of Roseville, a higher elevation area within Roseville (Stoneridge), and another higher elevation area within Roseville (Highland Reserve North) that is currently served through an intertie with PCWA.

Water distribution is accomplished through over 400 miles of water transmission and distribution mains ranging in size from 66" to 4" in diameter. The water system currently has 22 million gallons of storage to manage flow fluctuations on a daily basis and for emergency needs, and is projected to need a total of 48 million gallons of storage at system build-out.

Roseville operates a 60-mgd WTP (Roseville WTP) on Barton Road near Folsom Lake in the Granite Bay community. Raw water from Folsom Lake is conveyed to the water treatment plant through parallel 60-inch and 48-inch pipelines.

The Roseville WTP has been master-planned to an overall capacity of 100 mgd. The current plan is for expansions to be completed in two projects: expansion to 75 mgd, which is expected to be completed in mid-2006, and expansion to 100 mgd, which is expected to be completed in mid-2010.[19]

ROSEVILLE'S WATER SOURCES

Roseville does not own any water rights, but has entitlements through water sale contracts with other agencies.

Surface Water Contract Entitlements

Roseville has three sources of surface water diversions from the American River, as summarized in **Table A-20**.

[19] City of Roseville, *2002 Urban Water Management Plan*, July 2002, p.13.

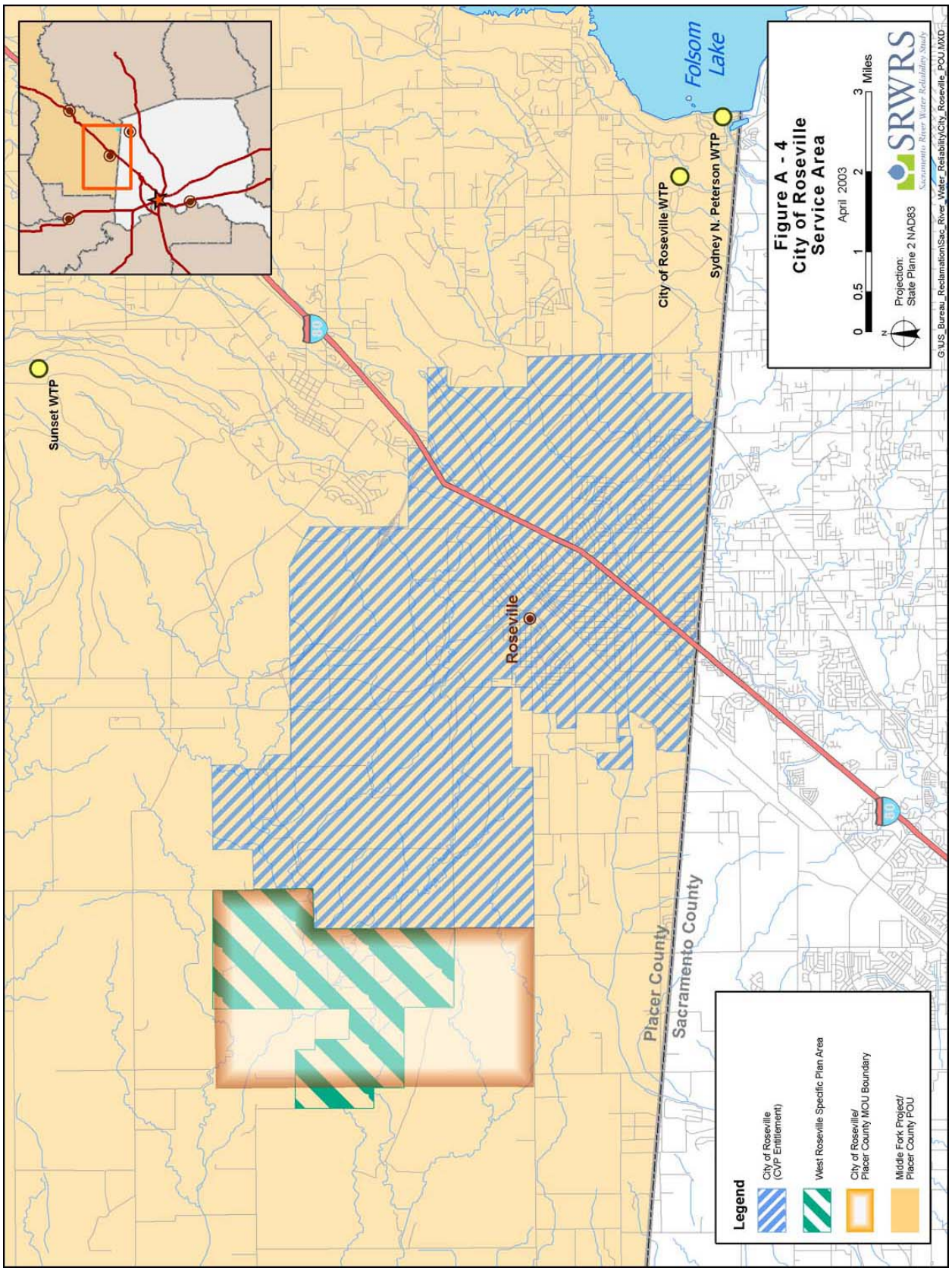

Figure A-4. Roseville's Service Area and Vicinity

Table A-20. Roseville's Surface Water Entitlements

Water Source	Contract Amount (AF per year)		Point of Diversion
	Wet/Average Years	Drier/Driest Years	
MFP	30,000	30,000	Folsom Dam
MFP (through SJWD)	4,000[1]	0	Folsom Dam
CVP	32,000	32,000	Folsom Dam
TOTAL	66,000	62,000	

[1] Includes 800 acre-feet of existing transfer amount, and 3,200 AF contingent on approval of the development of the area covered by Memorandum of Understanding with Placer County.

PCWA-Roseville MFP Water Sales Agreement

The latest agreement between PCWA and Roseville was signed on January 17, 1996 for the sale of up to 30,000 AF per year of MFP water. The contract stipulates a base amount of 10,000 AF per year and an optional amount of 20,000 AF per year. Under this agreement, the delivery point is at Folsom Dam and thus, Roseville has an active Warren Act contract with Reclamation for wheeling the water through Reclamation's facilities. Roseville is currently negotiating a long-term Warren Act contract that will eliminate the need for annual, as needed contracts.

Roseville-SJWD Water Sales Agreement

The agreement between Roseville and SJWD was signed on February 7, 2001, for the sale of up to 800 AF per year of water under the PCWA-SJWD MFP water sale agreement to provide for demands in the Doctor Ranch and Foothills Business Park areas. These two areas were not within the Roseville city limits at the time the WFA was negotiated and signed.

The Roseville-SJWD water sales agreement also states SJWD's intention of complying with its WFA PSA,[20] reducing diversions from the American River during drier and driest years. Consequently, this water supply is only available in wet and average years.

Roseville is currently negotiating with SJWD for a transfer of additional 3,200 AF per year of water in wet and average years under its PCWA-SJWD MFP water sales agreement to provide for demands in the West Roseville Specific Plan area. The West Roseville Specific Plan area is not within the current city limit, but is within Placer County. Roseville is also preparing an EIR for the development of the West Roseville Specific Plan. The draft EIR is expected to be available in summer 2003.

The delivery point is at the Hinkle Wye facility located at Folsom Dam. The delivery requires a Warren Act contract with Reclamation to wheel water through Reclamation facilities. Because this water is part of MFP water delivered to SJWD based on a PCWA-SJWD water sale agreement, wheeling would be covered by SJWD's Warren Act contract with Reclamation.

Roseville's CVP Contract Entitlement

The latest negotiated CVP water service contract between Roseville and Reclamation is for up to 32,000 AF per year of M&I water. The current authorized point of diversion is at the outlet of the 84-inch pipeline leading from Folsom pumping plant to Hinkle Reservoir and any additional point(s) of delivery either at CVP

[20] Under SJWD's WFA PSA, its baseline American River diversion is 54,200 AF per year. Under projected 2030 conditions, SJWD diverts and uses 82,200 AF per year in most years and reduces its diversion by up to 28,000 AF per year in drier and driest years.

American River Division Project facilities or other mutually agreed locations. This CVP water supply is, and would continue to be, subject to deficiencies of up to 50 percent.[21]

Roseville's Purveyor Specific Agreement in the WFA

In January 2000, Roseville became a signatory to the WFA. As stated in its PSA, the baseline diversion from the American River is 19,800 AF per year. Under projected 2030 conditions, Roseville diverts and uses up to 54,900 AF per year in most years and reduces diversions by up to 15,100 AF per year in drier and driest years. These limitations are applicable to the total diversion from its CVP and MFP entitlements. Note that the maximum diversion of 54,900 AF per year is less than Roseville's total surface water entitlements. Including the water transfer from SJWD, the maximum surface water diversion is 58,900 AF per year in most years, but remains at 39,800 AF per year in driest years. Allowable diversions for Roseville under the WFA are summarized in **Table A-21**.

Table A-21. Conditions of Roseville's American River Diversion Under Its WFA PSA

Unimpaired Inflow to Folsom Lake, March – November (AF)	Maximum Annual Diversion from American River (AF)
≥ 950,000	58,900[1]
≥ 400,000 and < 950,000	Linearly proportional between 39,800 and 54,900
< 400,000	39,800

[1] Including 4,000 AF of water transferred from SJWD. The amount is 54,900 AF under Roseville's WFA PSA.

Under the WFA, PCWA would release up to 20,000 AF of replacement water to the American River from reoperation of PCWA's MFP reservoirs. The purpose of the replacement water is to offset reductions in flows of lower American River due to increases in Roseville's diversions during drier and driest years. The replacement water remains in the river until it reaches its confluence with the Sacramento River. However, PCWA has agreed to release the replacement water from its MFP reservoirs only when a water transfer partner exists below the American River outlet. Roseville's obligation to provide replacement water under its WFA PSA is summarized in **Table A-22**.

Table A-22. Conditions of Roseville's Replacement Water Under Its WFA PSA

Unimpaired Inflow to Folsom Lake, Mar – Nov (AF)	Amount of Replacement Water[1] (AF)
≥ 950,000	0
≥ 400,000 and < 950,000	Linearly proportional between 0 and 20,000
< 400,000	20,000

[1] Water will be made available by reoperation of PCWA's MFP reservoirs. Releases will be contingent upon the following conditions:

a. PCWA's ability to sell the released water for use below the Lower American River on terms acceptable to PCWA.
b. PG&E's agreement to such reoperation until the present power purchase contract with PG&E expires in 2013.
c. PCWA's determination that it has sufficient water in its reservoirs to make additional releases to mitigate conditions in dry years without jeopardizing the supply for PCWA's customers. (Based on historical hydrology and projected 2030 requirements as set forth in the WFA, previous operational modeling results show that reoperation water should be available for such release and sale without drawing MFP reservoirs below 50,000 AF.)

[21] The 25 percent maximum deficiency for M&I supply from CVP proposed in the *Draft M&I Water Shortage Policy*, dated September 2001, has not yet been adopted.

As previously mentioned, PCWA and Reclamation are negotiating refill conditions for release of replacement water from MFP storage. A draft agreement states that refilling MFP storage vacated by release of replacement water would not be allowed until Folsom Lake makes a flood control release. This criterion suggests that replacement water would bypass Folsom Dam, but not be re-regulated by Reclamation.

Groundwater

Roseville has access to groundwater and would have sufficient groundwater extraction capacity (existing and planned wells) to meet a portion of supply during times of shortage. Roseville's WFA PSA is silent on its maximum allowable groundwater extraction. Roseville has agreed to participate in responsible management of the groundwater basin although it is located within Placer County and is therefore outside the purview of the SGA.

Other Water Sources

Recycled Wastewater. Both of Roseville's wastewater treatment plants (WWTP) – the existing Dry Creek WWTP and the under-construction Pleasant Grove WWTP – are designed for tertiary treatment and could produce this supply. Recycled wastewater would be used for outdoor irrigation purposes.

Extra Ordinary Water Conservation. Water conservation programs are currently in effect within Roseville's service area. However, extra ordinary water conservation would be implemented in driest years and treated as a source of supply in 2030.

ROSEVILLE'S 2030 WATER SUPPLY AND DEMAND ESTIMATES

Roseville's 2030 water supplies and demand projections in **wet**, **average** and **driest** years are presented in **Tables A-23, A-24, and A-25**, respectively. Per WFA limitations, the allowable surface water diversion from the American River and the amount of replacement water in **drier** years are between the quantities of average and driest years, linearly interpreted based on the March-through-November unimpaired inflow to Folsom Lake.

Table A-23. Roseville's 2030 Annual Demands and Supplies in Acre-Feet (Wet Years, 62% Occurrence Frequency)

Type of Use	Area	Demand	Surface Water			Groundwater	Reclaimed	Extra Ordinary Conservation	Unmet Demand
			MFP	CVP	SJWD				
M&I	Roseville	51,620[1]	20,740	30,080[2]	800[4]				0
	MOU Area	12,400[1]	4,080	0	3,200[4]		2,773[1]		2,347
Subtotal		64,020	24,820[3]	30,080[3]	4,000		2,773		2,347
Remaining Amount[5]			5,180	1,920	0				
Total Water Rights/Entitlements			30,000	32,000	4,000				

[1] Based on *Technical Memorandum on Water Supply Strategy for Water Master Plan Update* (MWH, November 6, 2002) with minor adjustments developed in the ongoing West Roseville Specific Plan EIR.
[2] Assumed 6 percent CVP North-of-Delta M&I deficiency. See Attachment A for details.
[3] 54,900 AF is the WFA limitation on Roseville's total diversion of its CVP and MFP entitlements from the American River.
[4] 800 AF is for Doctor Ranch and the Foothill Business Park area; 3,200 AF is for the West Roseville Specific Plan areas.
[5] Due to WFA limitations, assumed CVP deficiency, and estimated demand.

Table A-24. Roseville's 2030 Annual Demands and Supplies in Acre-Feet (Average Years, 24% Occurrence Frequency)

Type of Use	Area	Demand	Surface Water			Groundwater	Reclaimed	Extra Ordinary Conservation	Unmet Demand
			MFP	CVP	SJWD				
M&I	Roseville	51,620[1]	24,260	26,560[2]	800[4]				0
	MOU Area	12,400[1]	4,080	0	3,200[4]		2,773[1]		2,347
Subtotal		64,020	28,340[3]	26,560[3]	4,000		2,773		2,347
Remaining Amount[5]			1,660	5,440	0				
Total Water Rights/Entitlements			30,000	32,000	4,000				

[1] Based on *Technical Memorandum on Water Supply Strategy for Water Master Plan Update* (MWH, November 6, 2002) with minor adjustments developed in the ongoing West Roseville Specific Plan EIR.
[2] Assumed 17percent CVP North-of-Delta M&I deficiency. See Attachment A for details.
[3] 54,900 AF is the WFA limitation on Roseville's total diversion of its CVP and MFP entitlements from the American River.
[4] 800 AF is for Doctor Ranch and the Foothill Business Park area; 3,200 AF is for the West Roseville Specific Plan areas.
[5] Due to WFA limitations, assumed CVP deficiency, and estimated demand.

Table A-25. Roseville's 2030 Annual Demands and Supplies in Acre-Feet (Driest Years, 2% Occurrence Frequency)

Type of Use	Area	Demand	Surface Water			Groundwater	Reclaimed	Extra Ordinary Conservation	Unmet Demand
			MFP	CVP	SJWD				
M&I	Roseville	51,620[1]	17,480	18,240[2]	0	7,300[5]	3,000[5]	5,600[5]	0
	MOU Area	12,400[1]	4,080	0	0	0	2,773[1]	620[1]	4,927
Subtotal		64,020	21,560[3]	18,240[3]	0	7,300	5,773	6,220	4,927
Remaining Amount[6]			8,440	13,760	0				
Total Water Rights/Entitlements			30,000	32,000	0[4]				

[1] Based on *Technical Memorandum on Water Supply Strategy for Water Master Plan Update* (MWH, November 6, 2002) with minor adjustments developed in the ongoing West Roseville Specific Plan EIR.
[2] Assumed 43 percent CVP North-of-Delta M&I deficiency. See Attachment A for details.
[3] 39,800 AF is the WFA limitation on Roseville's total diversion of its CVP and MFP entitlements from the American River.
[4] No contract entitlement in drier and driest years.
[5] From Roseville's WFA PSA.
[6] Due to WFA limitations, assumed CVP deficiency, and estimated demand.

Demand Estimate

Demand estimates were made for two areas (see **Figure A-4**):

- The area within the current city boundary covered in the 1993 *City of Roseville Water Supply Master Plan*

- The urban growth area west of Roseville covered by a Memorandum of Understanding between Roseville and Placer County (termed the MOU Area). The MOU area includes the following developments: Fiddyment Ranch, Westpark, and MOU Transition Area. Fiddyment Ranch and Westpark together make up the West Roseville Specific Plan, for which Roseville is currently preparing an EIR regarding potential development.

Roseville is expected to reach its build-out demand by 2030. In the ongoing effort to prepare the West Roseville Specific Plan EIR, Roseville re-evaluated demand estimates and projected 51,620 and 12,400 AF per year for the area within the existing city limits and the MOU area, respectively.

Supply Estimate

The 2030 supply estimate is based on existing and currently approved facilities and operations.

MFP Water Supply

As previously discussed in PCWA's water supply, the full amount of contracted MFP diversion (through the Roseville-PCWA contract or Roseville-SJWD contract) would be available. However, this diversion and the CVP water supply are subject to WFA limitations on total diversion from the American River.

CVP Water Supply

The CVP water supply is subject to Reclamation's CVP Shortage Policy. To further define the reliability of the CVP water supply, the September 2002 CALSIM II Benchmark Study for 2020[22] level of demand was used. The average deficiency rates for wet, average, drier and driest years are 6, 17, 25 and 44 percent, respectively. (See Attachment A for details.) As previously mentioned, this diversion and the MFP water supply are subject to WFA limitations on total diversion from the American River.

Groundwater

In its WFA PSA, Roseville agreed to extract 6,500 AF of groundwater to meet demands within Roseville at that time during drier and driest years. The Foothill Business Park annexation added an additional 800 AF of drier and driest year groundwater need resulting in a total anticipated need of 7,500 AF to meet projected demand. Based on the ongoing work developed for the West Roseville Specific Plan EIR, Roseville does not plan to increase groundwater pumping to meet demand in the MOU area during wet/average years.

Other Water Supply

In Roseville's WFA PSA, up to 3,000 AF per year of recycled wastewater would be used to meet non-potable water demands (i.e., outdoor irrigation and industrial uses), and up to 5,600 AF per year of extra ordinary water conservation would be accomplished. Note that Roseville's WFA PSA is silent on the maximum amounts for each water source.

For the MOU area, Roseville identified up to 2,773 AF per year of recycled wastewater to be used to meet non-potable water demand, and up to 620 AF per year of extra ordinary water conservation in drier and driest years.

Facility Capacity

The Roseville WTP has a capacity of 60 mgd for diversion from the American River and has been master-planned to an overall capacity of up to 100 mgd. Ultimate planned capacity is sufficient to treat the maximum diversion per year of 58,900 AF, including the 4,000 AF transferred from SJWD, on a max-day demand basis.

Balancing the 2030 Demand and Supply and Increasing Water Supply Reliability

Based on the above analysis, Roseville must acquire additional water supply to alleviate a water shortage of up to about 5,000 AF per year.

Roseville's current policy is to observe the limitations in its WFA PSA on diversion from the American River. That is, within Roseville's contract entitlements of 62,000 AF per year (30,000 AF per year from the MFP and 32,000 AF per year from the CVP), up to 7,100 AF per year of entitlements cannot be exercised due to WFA

[22] CALSIM Benchmark Study for a 2030 Level of Demand is not currently available.

limitations on Roseville's diversion from the American River.[23] This additional water supply can be used to reduce the projected shortage and facilitate Roseville's conjunctive management program through in-lieu recharge or an Aquifer Storage and Recovery Program.[24]

In this study, Roseville intends to exercise its remaining contract entitlement of 7,100 AF per year to divert from rivers other than the American River to satisfy the unmet demand and further contribute to groundwater conjunctive use programs. Roseville does not have a facility for diverting from rivers other than the American River. Therefore, to meet the max-day demand, Roseville would need a capacity of 10 mgd[25] and associated pipelines for distribution.

CITY OF SACRAMENTO

The needs assessment for Sacramento includes discussions on the legal framework governing Sacramento, Sacramento water system and water sources, and estimates of Sacramento's 2030 water demand and supply.

LEGAL FRAMEWORK GOVERNING SACRAMENTO

Sacramento is a charter municipality and provides water supply and service to consumers within the city limits, pursuant to Section 11 of the City Charter. Sacramento also provides needed retail, wholesale, and wheeling service outside the city (see **Figure A-5**), as described below.

Fairbairn Water Treatment Plant

SACRAMENTO'S WATER SYSTEM

Sacramento currently maintains approximately 645,947 linear feet (122 miles) of primary water transmission main pipelines (i.e., larger than 12 inches in diameter). In addition, Sacramento maintains nine enclosed storage reservoirs with a total capacity of 39 million gallons. Currently, Sacramento operates its two WTPs (Fairbairn WTP and Sacramento River WTP) for its customer needs.

Fairbairn WTP was constructed in 1964 on the south side of American River about seven miles upstream from its confluence with the Sacramento River. Sacramento River WTP began operation in 1924 on the east bank of Sacramento River below the confluence of the American River. These two plants are currently under expansion, and construction is expected to be completed in 2005. When completed, the water treatment capacity of Fairbain WTP will increase from 100 mgd to 200 mgd, and that of Sacramento River WTP will increase from 135 mgd to 160 mgd.

In addition to surface water supply, Sacramento currently operates 29 active municipal groundwater supply wells, with 27 of these wells located within the city limits north of the American River, and the remaining 2 wells located south of the American River. The total capacity of the well

Sacramento River Water Treatment Plant

[23] The maximum diversion from the American River for Roseville is 54,900 AF per year in Water Forum wet and average years.

[24] Roseville is current developing a pilot study for an ASR program in Dry Creek area.

[25] Using a factor of two to convert the average-day demand to the max-day demand, and rounded up to the nearest capacity by a 5-mgd increment.

pumping facilities is about 30 mgd, with sustainable capacity of approximately 24 mgd.[26]

Although Sacramento has developed this groundwater supply, its long-term goal is to minimize its reliance on groundwater to avoid groundwater quality problems and to reduce Sacramento's contribution to existing or future groundwater overdraft conditions. Sacramento intends to focus on surface water as its primary supply, to the extent possible.

SACRAMENTO'S WATER SOURCES

Sacramento has water rights on both the American River and the Sacramento River. Currently, Sacramento does not have water sources contingent on other agencies' water rights or contract entitlements.

Surface Water Rights

Sacramento has rights to use water from both the American and Sacramento Rivers. Sacramento has a pre-1914 right to divert up to 75 cfs of Sacramento River water. Sacramento also holds Permit 992 (A1743, 3/30/20) for diversion of up to 225 cfs, up to 81,800 AF per year, from the Sacramento River for service within the City limits. The allowable POU is the City of Sacramento. Sacramento also holds four permits for diversion of American River water. Permits 11358 (A12140, 10/29/47) and 11361 (A16060, 9/22/54) allow direct diversion of up to 675 cfs at Fairbairn WTP for use in a POU of 79,500 acres that includes Sacramento city limits and areas within Sacramento County. Permits 11359 (A12321, 2/13/48) and 11360 (A12622, 7/29/48) allow rediversion at Fairbairn WTP, Sacramento WTP, and other locations of up to 589,000 AF per year of water diverted by SMUD at its Upper American River Projects for use in a POU totaling 96,000 acres that includes Sacramento city limits and areas in Sacramento County on the east side of Sacramento.

Water available to Sacramento under its water rights permits is also subject to a water rights settlement contract between Sacramento and Reclamation. On June 28, 1957, Sacramento and Reclamation entered into a permanent water rights settlement contract. In the contract, the maximum annual diversion from the American River is specified by a gradually increasing schedule. In 2030, the maximum diversion under its American River water rights is 245,000 AF. Sacramento agreed to limit its diversions under its water right permits to not more than 225 cfs of Sacramento River water and not more than 675 cfs of American River water. In turn, Reclamation guaranteed availability of those amounts to Sacramento with no deficiencies.

The WFA limits Sacramento's American River diversions under certain flow conditions and Sacramento anticipates recovering those reductions at a downstream location on the Sacramento River (its existing Sacramento River WTP).

Existing Water Sale Agreements

Currently, Sacramento has agreements with the following water purveyors:

- **Cal-American (former Citizens Utilities Company before its merger with Cal-American)** — In 1997, the City entered into a wholesale[27] agreement with Cal-American to supply treated water to the Southgate area of South Sacramento. Under the terms of this agreement, Sacramento will supply up to 5.8 mgd to Cal-American, to an annual maximum of 2,580 acre-feet, to offset Cal-American' current use of groundwater.

[26] From *Water Facilities Expansion Project EIR* (Sacramento, 2000).
[27] Wholesale means the sale of treated Sacramento water to other water purveyors within Sacramento's POU.

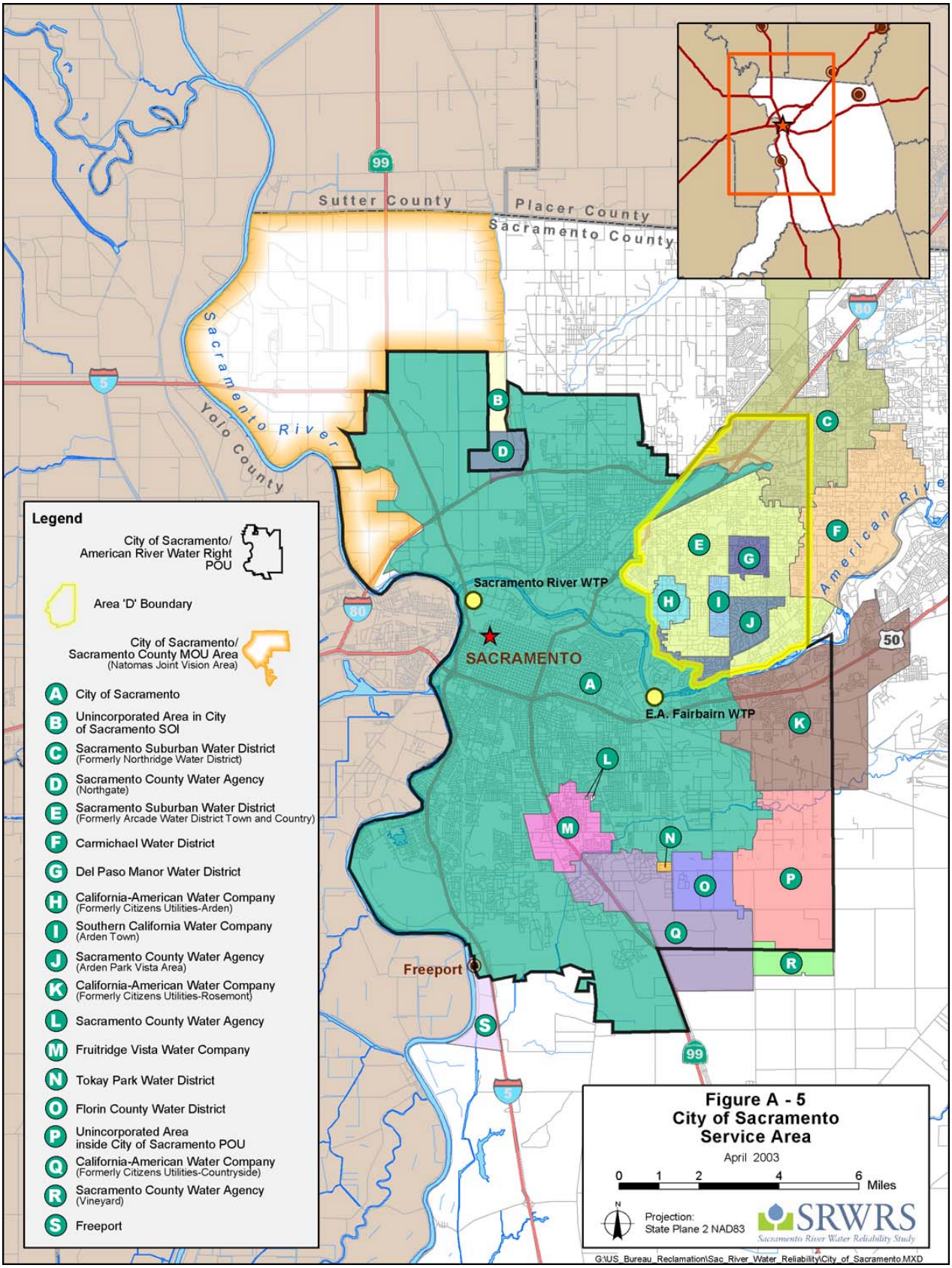

Figure A-5. Sacramento's Service Area and Vicinity

- **SSWD (former AWD)** – SSWD is entitled to divert up to 26,064 AF per year of raw surface water from the American River under a 1964 agreement, as discussed previously in the Appendix.

Existing Water Wheeling Agreement

Wheeling for purposes of this Appendix means the agreed upon use of Sacramento's facilities to divert, treat, and deliver water under other purveyors' water rights or contract entitlements. Because the water belongs to another entity, use of the wheeled water would be subject to the terms and conditions of the relevant water right or contract, rather than those associated with Sacramento's rights. Currently, Sacramento has water wheeling agreement with the following water purveyor for surface water supply:

- **Sacramento County Water Agency (SCWA)** — SCWA provides water service to the Elk Grove/Laguna area. Reclamation provides up to 15,000 AF per year pursuant to a water supply contract, which is pursuant to Public Law 101-514. On April 4, 2000, Sacramento, Sacramento County, and the SCWA entered into an agreement for use of Sacramento's Sacramento River WTP to divert and treat up to 11 mgd of SCWA's water for delivery to areas served by SCWA.

Sacramento's Purveyor Specific Agreement in the WFA

Sacramento is also a signatory of the WFA. Sacramento's WFA PSA places no limitations on Sacramento's diversion of Sacramento River water, but specifies the use of Fairbairn WTP diversion capacity:

- In extremely dry years,[28] Sacramento restricts its diversion under its water rights at Fairbairn WTP to not greater than 155 cfs and not greater than 50,000 AF per year.
- For other years, Sacramento may divert under its water rights at the Fairbairn WTP pursuant to the criteria summarized in **Table A-26**.

Table A-26. Conditions of Sacramento's Fairbairn WTP Diversions in "Other Years" (Not Extremely Dry Years) Under Its WFA PSA

Diversion Criteria	Maximum Diversion Rate at Fairbairn WTP (cfs)	
If the flow bypassing the diversion at the FWTP is greater than the Hodge Flow Condition[1],[2]	1/1 – 12/31	310
If the flow bypassing the diversion at the FWTP is less than the Hodge Flow Condition[1],[3]	1/1 – 5/31	120
	6/1 – 8/31	155
	9/1 – 9/30	120
	10/1 – 12/31	100

[1] Hodge Flow Condition: Parties to the litigation (*Environmental Defense Fund et al. v. East Bay Municipal Utility District*) cannot divert water from the American River unless instream flows measure at least 2,000 cfs from October 15 through February; 3,000 cfs from March through June; and 1,750 cfs from July through October 14.

[2] In accordance with wholesale agreements, Sacramento may deliver water diverted or treated at Fairbairn WTP to public or private water purveyors on a wholesale basis anywhere within the POU as it existed on January 1, 1997.

[3] Water diverted or treated at Fairbairn WTP may be delivered on a wholesale or wheeling basis to any public or private water purveyors provided the rate of "pumpback" is equal to or exceeds the rate of delivery for these purposes on a daily basis. "Pumpback" is used to assume the existence of a metered raw water conveyance facility delivering water from near the confluence of the Sacramento and American rivers to the Fairbairn WTP.

Groundwater

The WFA assumes that Sacramento would continue to use groundwater to fill part of its demand within the current city limit. As previously mentioned, the available capacity for groundwater production is about 24

[28] Sacramento's WFA PSA has a slightly different definition for water year type. Extremely dry years are years in which the annual projected unimpaired inflow into Folsom Lake is 550,000 AF or less, also referenced as the March-through-November unimpaired flow into Folsom Lake of less than 400,000 AF.

mgd, and annual use is about 23,000 AF. However, Sacramento's future policy is to achieve the goal of using groundwater only during driest years and emergencies to promote conjunctive use and avoid groundwater overdraft.

Sacramento's WFA PSA is silent on its maximum annual allowable groundwater extraction. However as prescribed in the WFA, the long-term sustainable yield of the North Area[29] groundwater basin is 131,000 AF per year. Along with all other WFA signatories within the North Area groundwater basin, Sacramento would work with the SGA to maintain that yield.

SACRAMENTO'S 2030 WATER DEMAND AND SUPPLY ESTIMATES

Sacramento's 2030 water demand and supply estimates were analyzed differently than for the other three water purveyors because the WFA limitations on the diversion from the American River are based on flow in the river instead of annual volume. Therefore, more focus is placed on the diversion and treatment capacity for the max-day demand.

Demand Estimate

In addition to retail demands within Sacramento city limits, it is anticipated that more water purveyors within Sacramento's POU or existing Sphere of Influence[30] would desire a wholesale supply of surface water from Sacramento. Sacramento is also planning to accommodate a potential wheeling request from Sacramento County to the developing Natomas Basin as part of the ongoing Natomas Joint City-County Planning Vision (Natomas Joint Vision). Natomas Basin included in Natomas Joint Vision is within Sacramento County but outside Sacramento's American River water rights POU. (See **Figure A-5**.)

If requests for wholesale and wheeling were less than expected, additional capacity would become redundancy for Sacramento to overcome water supply difficulties during facility maintenance or repair periods and emergencies such as chemical spills on the American River or other events that may disable City facilities.

Table A-27 shows the estimated annual and max-day demands for the Sacramento's American River water rights POU and potential water wheeling area outside the POU. The annual demand for areas outside Sacramento city limits represents the maximum demand that requests either Sacramento's retail/wholesale or wheeling capacity because the purveyors[31] serving these areas have access to groundwater. Consistent with the WFA, Sacramento could be requested to provide surface water to meet these maximum demands in wet and average years.

Supply Estimate

Surface Water

As previously mentioned Sacramento's permanent water rights settlement contract guarantees no deficiency in Sacramento's water supply up to the maximum diversions specified in the contract. Therefore, in the supply estimate, no deficiency is taken on surface water supply. For 2030, total diversions under its water rights on the American and Sacramento rivers are up to 245,000 and 81,800 AF per year, respectively, but subject to physical and/or contractual capacity limitations of diversion and treatment facilities. In particular, operation of Fairbairn WTP would be subject to the limitations in Sacramento's WFA PSA.

[29] See Footnote 17.
[30] Sphere of Influence is a plan for the probable physical boundaries and service area of a local agency as determined by the Local Agency Formation Commission (Curtin and Talbert, *Curtin's California Land Use and Planning Law*, 2002).
[31] Not all of these water purveyors are signatories of the WFA. Most of the area

Table A-27. Estimated Annual and Max-day Demands for Sacramento

Type of Use	Area	Annual Demand[1] (AF)	Max-Day Demand[2] (mgd)
M&I	American River POU		
	City of Sacramento	157,268	253
	Area "D"		
	ASA (Town and County)	17,986	29
	Cal-American (Arden)	1,565	3
	DPMWD	3,340	5
	SCWC (Arden Town)	1,373	2
	SCWA (Arden Park Vista)	3,146	5
	Subtotal in Area "D"	27,410	44
	Cal-American (Rosemont)	11,755	19
	Cal-American (Countryside)	9,969	16
	Florin County WD	3,637	6
	Unincorporated Area	14,148	23
	Freeport	1,850	3
	Fruitridge Vista WC	4,769	8
	Total in AR POU	230,806	372
	Current SOI (outside AR POU)		
	SCWA (Northgate)	3,413	6
	Unincorporated Area	351	1
	Subtotal in Current SOI	3,764	7
	Natomas Joint Vision		
	Metro Airpark	4,817	8
	Sacramento International Airport	840	1
	Other Urban Areas	17,018	27
	Total Natomas Joint Vision	22,675	36
Total		257,245	415

[1] Based on the demand estimated by Sacramento (March 2003), except the demands in Area D are based on ARBCA RWMP (2001).
[2] A factor of 1.8 is used to convert the average-day demand to the max-day demand.

The limitations on the diversion at Fairbairn WTP are flow-based, except that a volumetric maximum of 50,000 AF per year in driest years is also specified. Flow-based limitations result in difficulties for quantifying the volumetric shortage that Sacramento might experience in the future. Therefore, the comparison of demand and supply for Sacramento is better illustrated through comparison of max-day demand and available/allowable facility capacity.

Table A-28 shows the comparison of water demand and supply on a max-day basis. As previously mentioned, after the expansion of Fairbairn and Sacramento River WTPs, Sacramento would have a total diversion and treatment capacity of 360 mgd (about 557 cfs). Compared with the required max-day demand of 415 mgd (usually occurs in July or August), there would be a shortage of 55 mgd in facility capacity to meet the max-day demand. However, when Hodge flow conditions occur, Sacramento's diversion at Fairbairn WTP would be reduced by 100 mgd (155 cfs) in July and August. Total available capacity for meeting the max-day demand would be reduced to 260 mgd, resulting in an exacerbated shortage of 155 mgd.

Table A-28. Sacramento's 2030 Water Demand and Supply on a Max-day Basis

Hydrologic Condition	Max-day Demand (mgd)	Maximal Diversion Rate[3] (mgd)		Groundwater[4] (mgd)	Unmet Max-day Demand (mgd)
		Fairbairn WTP	Sacramento River WTP		
Above Hodge[1]	415	200	160	0	55
Below Hodge[2]	415	100	160	0	155

[1] Above Hodge: The American River flow is above the flow thresholds set forth by the Hodge decision.
[2] Below Hodge: The American River flow is below the flow thresholds set forth by the Hodge decision.
[3] For Fairbairn WTP, the maximum diversion rate is limited by Sacramento's WFA PSA; for Sacramento River WTP, the maximum diversion rate is limited by the physical capacity after the expansion.
[4] Sacramento's future policy is to adhere goal of only using groundwater in driest years or emergencies.

Bypass flows at Fairbairn WTP depend on Folsom Dam operation. Hodge flow condition may become controlling even in wet and average years. There is no hydrologic modeling currently available to demonstrate the occurrence of Hodge Flow conditions in 2030 and the probability that operation of Fairbarin WTP might be constrained when Sacramento is providing surface water supply (including wheeling) to Sacramento's POU and Natomas Basin.[32] According to the September 2002 CALSIM II Benchmark Study for 2020 level of development, which assumes Sacramento provides for demands within the current city limits, 59 years out of the 73-year simulation period (1922 through 1994) are considered Water Forum wet and average years. Operation of Fairbairn WTP would have been restricted in peak months (June through August) in 29 out of the 59 wet and average years. This high frequency (about 50 percent) of Hodge Flow conditions in peak months during wet and average years would significantly stress Sacramento's water supply system.

These diversion limitations could translate into a volumetric shortage for Sacramento's water supply. To illustrate this point, **Table A-29** demonstrates possible scenarios for water supply impacts under different hydrologic conditions. Note that these are examples of operation restriction, but do **not** represent the future operation of Sacramento.

Groundwater

Sacramento's current use of groundwater is about 23,000 AF per year. Sacramento's goal in groundwater use is to reduce groundwater reliance as much as possible and thus, for planning purposes, groundwater use would be limited to driest years or emergencies.[33] The current 24-mgd reliable groundwater supply would produce up to about 26,800 AF of water supply to Sacramento's customer needs in driest years.

As previously mentioned, demands shown in **Table A-27** include the maximum amounts that Sacramento may be requested to provide or wheel to areas that currently rely primarily on groundwater. Because of the readily available groundwater capacity, groundwater can be used as supplemental water source when surface water supply is restricted by the WFA or physical limitations.

Balancing 2030 Supply and Demand and Increasing Water Supply Reliability

Sacramento has 245,000 AF per year of water rights on the American River that can be diverted at Fairbairn WTP and Sacramento River WTP. It also has 81,800 AF per year of water rights on the Sacramento River that can be diverted at Sacramento River WTP. Currently, Sacramento is using about 130,000 AF per year of these water rights, and the future use of American River water rights is subject to WFA limitations on diversions from the American River. For SRWRS, preliminary CALSIM II modeling results suggest that Sacramento would be able to divert about 200,000 AF annually in average under a 2020[34] level of development (i.e., the average surface water shortage is about 58,000 AF per year).

To provide reliable surface water supply to its customers, Sacramento would need at least another 155 mgd of surface water diversion and treatment capacity to accommodate increasing retail demand, anticipated requested to wholesale water within Sacramento's POU and wheeling request for areas outside of the POU, and the goal to reduce groundwater use. Thus, Sacramento intends to develop additional 165 mgd of diversion and treatment capacity to satisfy the need of 155 mgd and to provide a minimal redundancy of 10 mgd.

[32] The simulations for the WFA EIR assume Sacramento provides water supply only within the current city limits and assume groundwater use of 23,000 AF per year.

[33] The analysis supports the WFA assumes that Sacramento would use the available groundwater supply constantly and thus, this goal represents an enhanced condition of regional groundwater conjunctive management.

[34] The hydrology (or demand) for a 2030 level of development is currently unavailable.

Table A-29. Examples for Potential Volumetric Impacts on Sacramento's Water Supply from the WFA Limitations on Diversion from the American River

Hydrologic Condition	Category	Monthly Volume[5],[6] (AF)												Annual Total (AF)
		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	
Above Hodge[1]	Demand[3]	17,870	11,534	11,534	11,534	11,534	11,534	24,013	30,924	35,531	36,107	31,884	23,245	257,245
	Diversion at Fairbairn WTP	17,870	11,534	11,534	11,534	11,534	11,534	18,336	18,947	18,336	18,947	18,947	18,336	187,393
	Diversion at Sacramento River WTP	0	0	0	0	0	0	5,676	11,976	14,669	15,158	12,936	4,909	65,325
	Groundwater[4]	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total Supply	17,870	11,534	11,534	11,534	11,534	11,534	24,013	30,924	33,005	34,105	31,884	23,245	252,717
	Unmet Demand	0	0	0	0	0	0	0	0	2,526	2,002	0	0	4,528
Below Hodge[2]	Demand[3]	17,870	11,534	11,534	11,534	11,534	11,534	24,013	30,924	35,531	36,107	31,884	23,245	257,245
	Diversion at Fairbairn WTP	6,149	5,950	6,149	7,379	6,664	7,379	7,140	7,379	9,223	9,531	9,531	7,140	89,613
	Diversion at Sacramento River WTP	11,721	5,584	5,386	4,156	4,870	4,156	14,669	15,158	14,669	15,158	15,158	14,669	125,353
	Groundwater[4]	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total Supply	17,870	11,534	11,534	11,534	11,534	11,534	21,810	22,536	23,892	24,689	24,689	21,810	214,966
	Unmet Demand	0	0	0	0	0	0	2,203	8,387	11,639	11,419	7,195	1,435	42,279

[1] Above Hodge: The American River flow is above the flow thresholds set forth by the Hodge decision.

[2] Below Hodge: The American River flow is below the flow thresholds set forth by the Hodge decision.

[3] The estimated total annual demand of 257,245 AF is distributed according to the demand pattern of Sacramento's diversion in the September 2002 CALSIM Benchmark Study for a 2020 Level of Development.

[4] Sacramento's future goal in groundwater use is to only use groundwater in driest years or emergencies.

[5] Assumptions for monthly value calculation include:

- Maximum diversion rates used for Fairbairn WTP are based on WFA limitations.
- In Above Hodge conditions, demand is met by using diversions at Fairbairn WTP first.
- In Below Hodge condition and driest years, demand is met by using diversions at Fairbairn WTP for peak months.

[6] The operation scenarios are for illustration purposes to demonstrate the potential volumetric impacts to Sacramento's water supply due to limitations on diversions from the American River. They do **not** represent future operations of Sacramento's water supply system.

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